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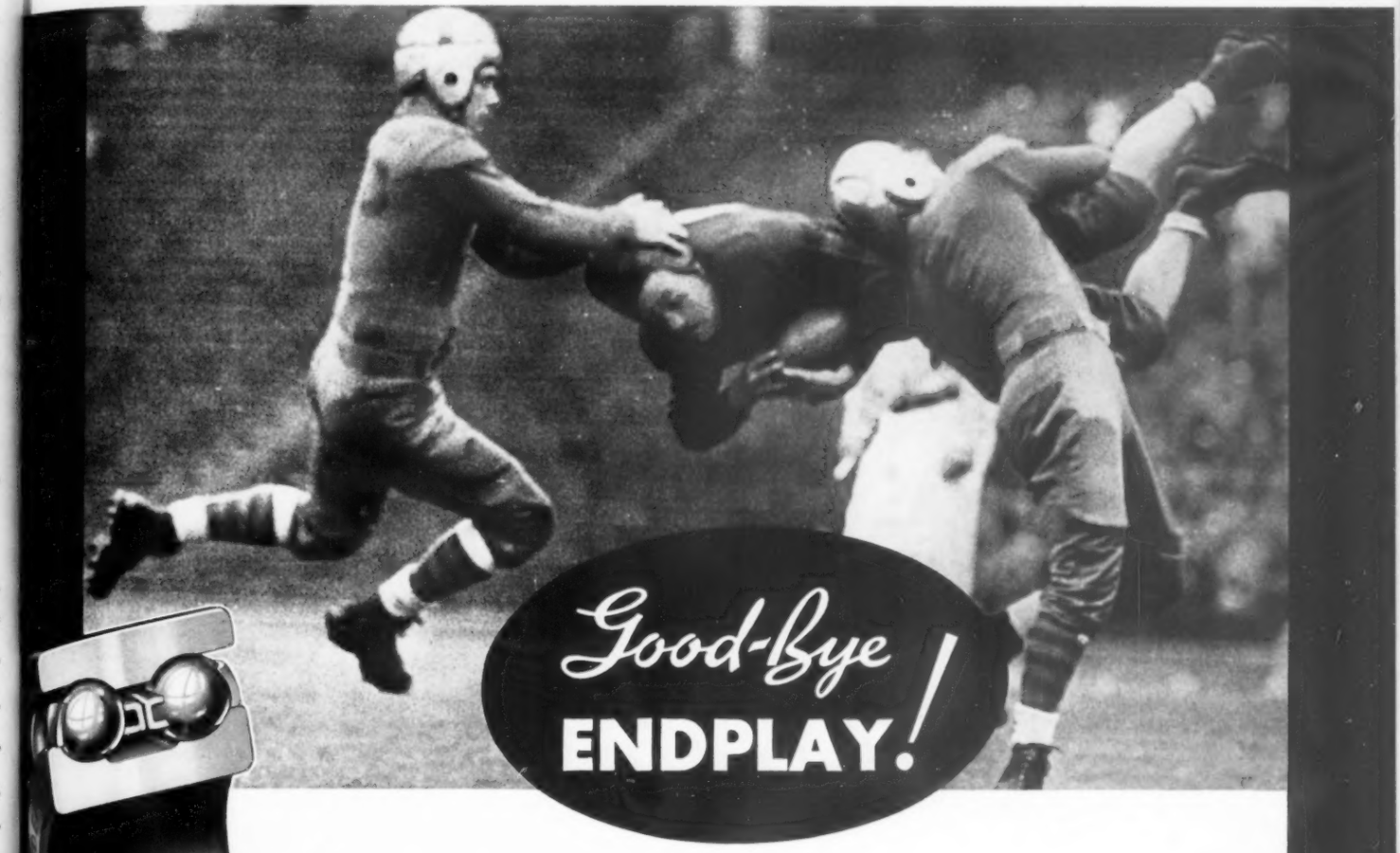

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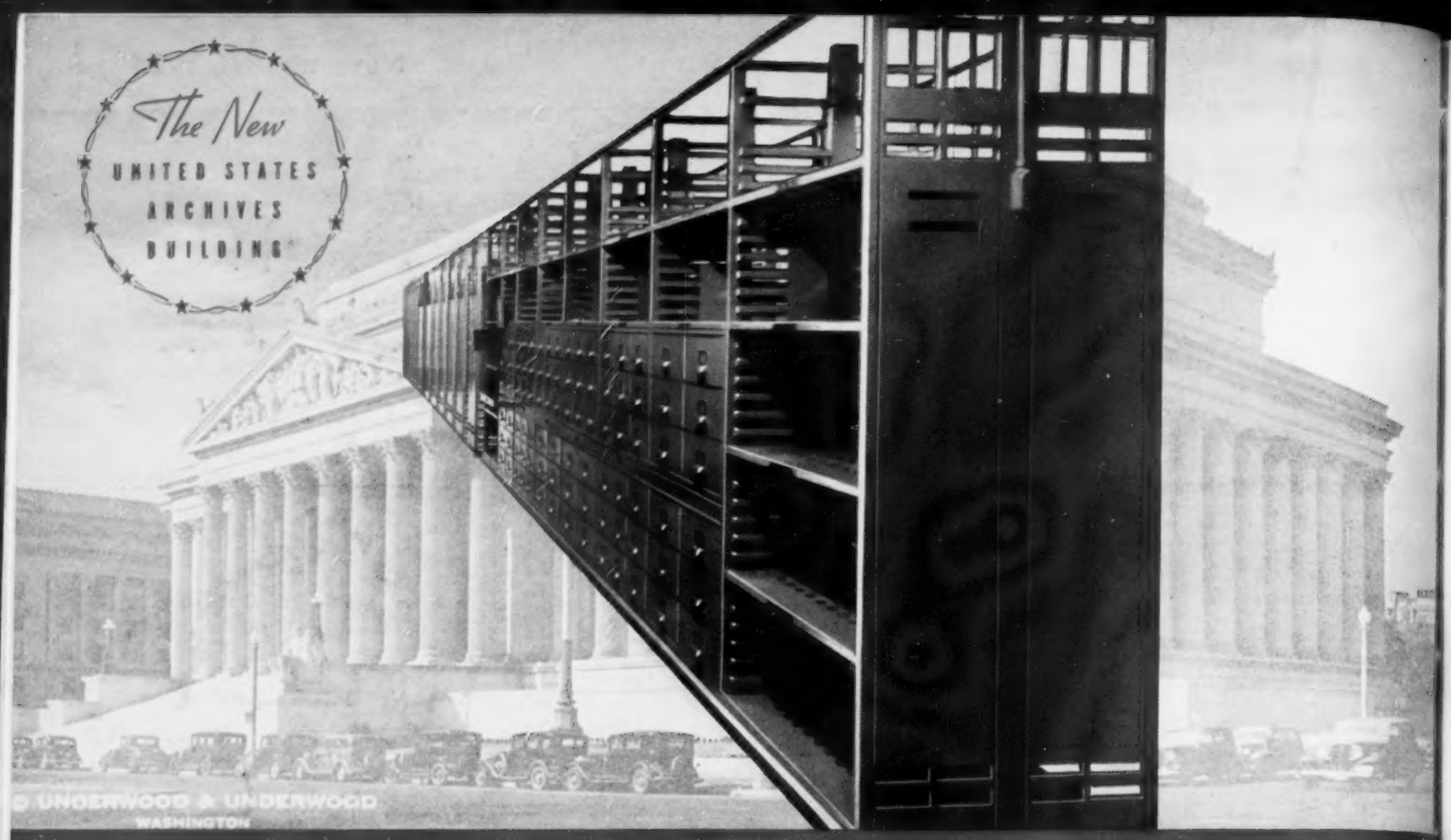

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STEEL
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As the Editor Views the News

MOST of us measure progress in terms of quantity. We have become accustomed to judging the trend of an industry by the ups and downs of its production curve. In the metalworking industries, tonnage is the basis of almost all of our calculations. We attach considerable weight to ratios such as price per ton, consumption per capita, profit per ton of ingot capacity, etc. In using such figures we assume that a ton of steel is a constant. We ignore the possibility that the average ton of 1935 steel, for instance, may be quite different from the average ton of 1915 steel.

• • •

Sees Revolution in Steel Industry

In other words, we fail to make allowances for quality. A contributor to STEEL contends that this is a serious oversight. He points out (p. 17) that the advent of the electric furnace just prior to 1910 and the rise in the importance of alloy steels, dating from about 1915, have contributed to a revolution in the steel industry which has shifted the emphasis from quantity to quality. Because of this, he declares that "during the active phase of the revolution, ordinary charts of steel production no longer have any clear significance as indices of trade activity or of changes in material well-being."

• • •

Must Recognize Quality Factor

Every well-informed observer will agree that an index which would embrace quality as well as quantity is highly desirable. An American executive speaking in Paris (p. 20) only last week called attention to the tendency in the steel industry to produce alloys that are "custom-built" to meet the specific requirements of given applications. As the production of alloy and special steels mounts in proportion to that of the ordinary carbon steels, the value of mere tonnage figures as an index of progress unquestionably will be further diminished. It will be difficult to reduce the variable of quality to cold statistics, but there is nothing to prevent the industry from shifting the emphasis from quantity to quality in the thinking and action of its executives. Such a shift will open up new vistas in merchandising opportunities and probably will suggest a revamping of traditional views on other problems of management.

• • •

Stability and High Wages

Automobile builders were applauded enthusiastically during the week of the New York show for their effort to stabilize employment by leveling off the seasonal peak and valleys of production. This raises the question (p. 29) as to whether stability can be achieved if the present tendency toward higher unit wages is permitted to continue unchecked. This is a problem of direct interest to every employer in the metalworking industries. At the present time unit wage rates in some lines are higher than in 1929. The present high hourly wages represent not only a fair wage for service rendered but also a bonus for not working more hours per year. Do you think this bonus should be continued indefinitely, or do you believe it should be exchanged gradually for more hours of work?

• • •

Finding Money for New Cars

The railroads need new cars and locomotives (p. 16) and a large volume of private capital is seeking safe investment. How to bring these two elements together is a problem that is receiving serious consideration. A plan for retiring 600,000 old cars and building 360,000 new ones should interest the steel and equipment people as it would involve a million tons—part of it low alloy, high strength steels—during a four-year period . . . . Observance of the Carnegie centennial late in November (p. 18) will bring to light many of the pioneer steelmaker's views on sociological problems, some of which apply appropriately to the conditions of today . . . . Now that the surface finish of metals is receiving more and more attention, the possibilities of etching (p. 32) are worthy of consideration.

E. L. Shaner

Rising Freight Traffic Spurs Car and Locomotive Program

WITH freight car loadings holding at close to 700,000 weekly, an occasional hint of a railroad reluctant to leave good-order cars go off its line, and increased interest manifested in new equipment—the Pennsylvania, Burlington, and Reading embarking on car building and repairing programs the past three weeks, involving a total of 12,350 units—Washington is beginning to take notice of the railroad equipment situation.

There is general agreement over the evident need of the carriers for improved rolling stock; the issue is the means for financing it.

Among the deterrents are the dire financial straits of many roads, some of which are losing more money this year than last, and the imminence of federal legislation designed to effect consolidations and the pooling of equipment.

Private Capital Hesitant

Among the favorable aspects are the certainty that business is definitely recovering, the effort to regulate highway competition, and the probability that recovery of even moderate proportions in the building industry will supply the railroads with a measure of bulk transportation which would restore them to a remunerative condition regardless of increased competition.

In some quarters there is discussion that the time has arrived for private capital, seeking remunerative and safe investment, to assist in the rehabilitation of the railroads. Failure to do so, it is argued, would supply "new dealers" with an added argument that capital has not taken advantage of the President's "breathing spell" and that any comeback of the railroads must necessarily be under the aegis of the government

With private capital ample and the railroads admittedly sorely in need of equipment, what appears to be lacking is a bridge that would link these two situations. That bridge may be supplied if a means of financing this new equipment on a basis tantamount to rental can be set up.

Such a plan is being privately discussed now in Washington. It would not only place the railroads in a more efficient position but it also would provide tonnage for the steel industry and speed up employment in the steel and the car and locomotive-building industries. The nubbin of this plan is:

Of the 1,900,000 freight cars owned by the railroads, 600,000 are over 21 years old. Their net value is about $225,000,000. They could be replaced by approximately 360,000 modern cars, larger and more efficient, costing about $900,000,000.

A 4-year program would scrap 150,000 old cars per year and replace them with 90,000 modern cars per year. This would provide employment for 200,000 men continuously for four years. It would necessitate the purchase of a total of over 1,000,000 tons of iron and steel—chiefly the new high tensile alloys.

Repairs to these 600,000 old cars average $230 per car per year; repairs to the new cars during the first ten years of service are estimated to average $71 per car per year. An annual saving of $95,000,000, based upon less expensive repairs and adjusted depreciation, is visualized.

A central agency carrying out this program could buy 150,000 old cars a year at a net value of about $55,000,000 and scrap them at a salvage of $100 per car. The railroads could pay for the new cars in monthly installments equivalent to a *per diem* charge of $1. With no interest the first year and 4 per cent thereafter, this *per diem* rate would amortize the cost in nine years. In event payment for cars to be retired were eliminated, the period of amortization would be reduced to eight years.

So much for freight cars. A similar situation obtains in regard to locomotives. Out of 47,000 locomotives now owned by class 1 railroads, 61 per cent are over 20 years old, and of the remainder 60 per cent are 15 to 20 years old.

Discussions are on in regard to the construction of 1320 new locomotives a year for five years. Since one locomotive entails 87,000 man-hours of labor to build, a locomotive program of this proportion would require, in general terms, 65,000 men working 50 weeks a year, 35 hours a week, for five years.

Sense Weak Position of Roads

Both among "new dealers" and private interests there appears to be an increasing feeling of apprehension over the inability of the railroads to meet any sudden increased demand upon them, which might be the consequence of a sharp increase in business or the necessities of national defense.

Comparisons are being made with 1930, which was a year of good railway operation before the full effects of the depression were reflected in

(*Please turn to Page* 104)

A Unifier in Action

First photo taken of Benjamin F. Fairless, president of the new Carnegie-Illinois Steel Corp., at his desk in Pittsburgh undertaking the process of unifying two of the most important subsidiaries of the United States Steel Corp. Acme photo

Age of Alloys Is Upsetting Steel as a Barometer

BY KENNETH B. LEWIS
Consulting Engineer

THERE appeared in STEEL, March 25, 1935, page 13, a chart prepared by Ralph L. Harding, chief, metals and minerals division, United States department of commerce, with excerpts from Mr. Harding's deductions. The caption read: "War Unbalances Steel Trend Lines."

During the depression many such charts and studies have been published, and many such interpretations which, in the opinion of some observers, fail to place the major emphasis where it belongs, namely, inside the steel industry.

We are at present in the active phase of a complete revolution in steel technology which has upset, or at least has profoundly modified, the traditional position of steel production as a barometer of trade and an index of material well-being and progress.

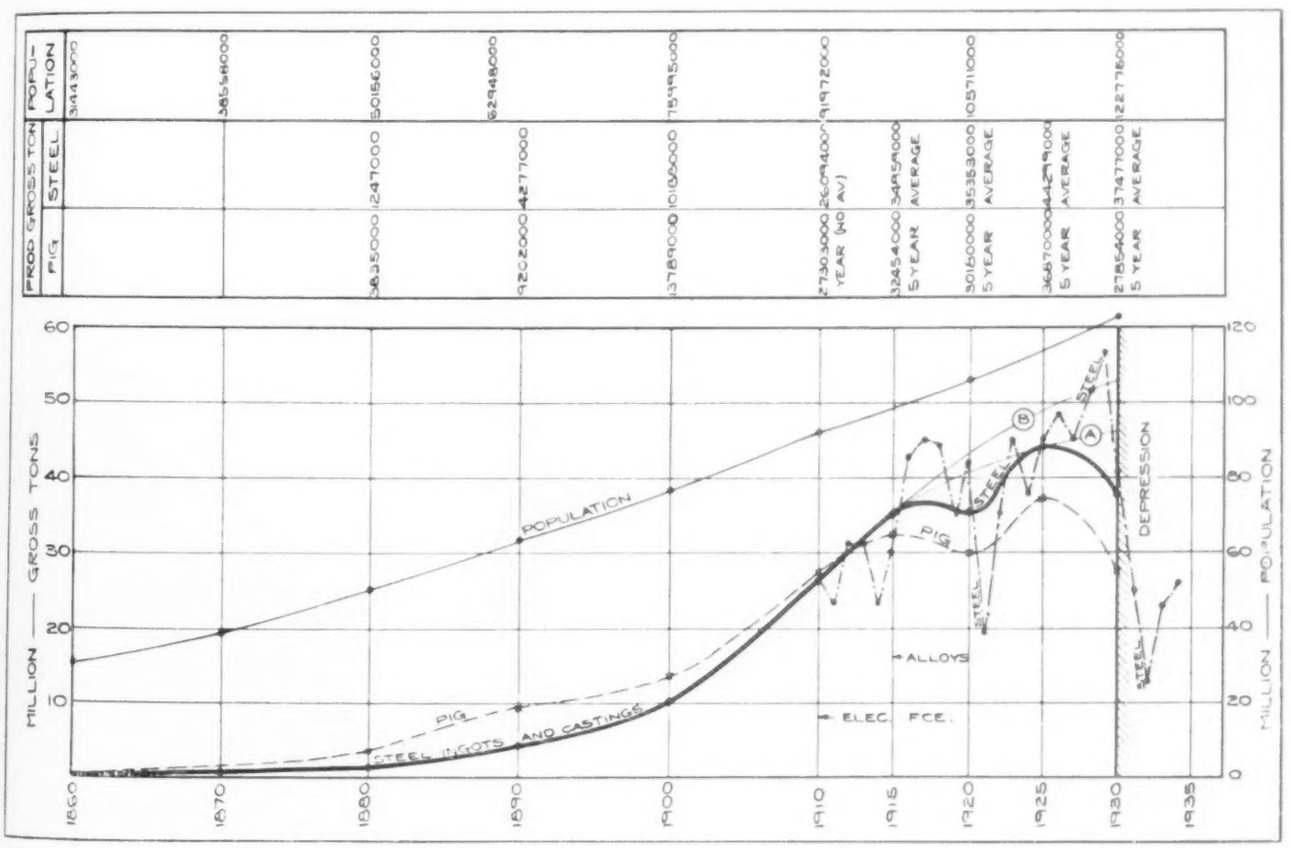
Its course may be followed best on the accompanying chart prepared by Jerome R. George, president, Aetna-Standard Engineering Co., Youngstown, O., and reproduced here with his consent. The significant points on the production curve are indicated by the words "Alloys" in 1915, and their precursor "Electric Furnace" in 1910.

Spurred by Electric Furnace

Serious attention to the large scale production of alloy steels, which was greatly assisted and stimulated by the prior introduction of the electric furnace, was the first great step in a long series of causes and consequences. It led to increased employment and better training of metallurgists. It stimulated greatly the study of heat treatment, to which alloy steels are peculiarly sensitive. It led to efforts to substitute rolled for machined surfaces, not only to conserve a high-priced metal of relatively low scrap value, but also to avoid operations which harder and tougher metals were constantly rendering more costly.

The rolling of alloy steels led directly to a stiffening of housings, bearings, and roll necks, and hence to a greater accuracy of rolled sections in carbon as well as in alloy steels, which in turn permitted a reduction in safety factor by engineers. The latter result must be credited in generous measure to increased uniformity achieved by steelmakers and accompanied by the prevention or removal of surface defects, both of which increased the confidence of the user.

More accurate rolling was followed in some cases by a redesign of sections, to secure a better balance between weight and stiffness. The interactions of these factors are complex and hard to trace but the trend is unmistakable. It is in the direction of making one pound of steel do the work of two. The automobile



STEEL LOSING BAROMETRIC SIGNIFICANCE? It is the contention of the author, basing some of his conclusions on this chart, that the industry "is in the midst of a complete revolution in steel technology, which has upset or profoundly modified the traditional position of steel production as a barometer of trade." Production of alloys is placing emphasis on quality, instead of quantity—the factor on which steel's reputation as a barometer has been rested. Because of extreme fluctations in production during the last 23 years due to war and depression, points on the curves on and after 1915 are based on a five-year average

and the airplane supplied much of the incentive.

Mr. Harding commented on the relatively enormous increase in capital investment beginning about 1915, which, he says, "may be related to the change in type of ownership which took place during these years."

It is perhaps a little unfair to weigh Mr. Harding's remarks apart from their contex, which is not available to us, but the implication seems to be that a change in type of ownership was the cause, and greatly increased capital investment the consequence.

The image evoked is that of outsiders gaining control, and proceeding to dissipate the stockholders' wealth by erecting costly memorials in the form of surplus plant. Nothing could be further from the truth. Unlike political emminence, leadership and control in industry are the usual fruits of a long apprenticeship in the accumulation and conserving of assets rather than their dissipation.

Stock ownership itself implies prudence and self-denial, which is more than can be said of the political franchise. The sequence of events in the early stages of the revolution was quite the reverse from that implied. The working of alloy steels called for heavier and more rigid equipment, involving in many cases investment of millions of dollars.

Companies which had not set aside surpluses of that type which is so repugnant to the instincts of amateur economists, found it necessary to change their capital structure. This is the "change in the type of ownership" of which Mr. Harding speaks. It was the consequence, rather than the cause, of increased investment per unit of production.

Reverting now from political to industrial economy, it is becoming clear that if steel is still our barometer the true index is no longer, as in the days of a static quality, pounds produced per capita, but rather pounds in service, a figure which may, in a changing technology, bear but a confused relation to production.

It is affected by a property of steel which we might call utility, and which includes as new factors the life of the steel and the service rendered per pound. It is easily conceivable that a pound of a 1935 ferrous alloy might have four or five times the utility of 1915 steel. In other words, the emphasis has shifted decisively from quantity to quality.

A potent factor in this phase of the revolution is fusion welding. Competent observers estimate the savings in weight involved in the substitution of welded for cast and riveted products at 25 per cent.

New Steels Last Longer

Other factors in the same trend operate by extending the life of steel. Conspicuous among them are stainless steels and steels offering resistance to corrosion by reason of great purity. Hot galvanizing has been vastly improved in the past 20 years. Plating with cadmium and chromium, enameling, rubber coating, spray metallizing, bonding of felts and textiles to a metal base, these and many related expedients are materially affecting the life cycle of ferrous products.

To summarize: A revolution in the steel industry has been in progress for about 20 years, and has shifted the emphasis from quantity to quality. It is suggested that wars, depressions, and political insanity have affected the curves much less than have these developments wholly within the industry.

During the active phase of the revolution, which is still with us, ordinary charts of steel production no longer have any clear significance as indices of trade activity or of changes in material well-being. If and when production statistics resume their place as reliable indices of these matters, the resulting curves will perhaps bear no simple relation to those on which we have so confidently relied in the past.

Andrew Carnegie Portraits, Epigrams, Presented to Libraries for Centenary

"This, then, is held to be the duty of the man of wealth: To set an example of modest . . . . living; to provide moderately for the legitimate wants of those dependent upon him; and, after doing so, to consider all surplus which comes to him simply as trust funds, which he is called upon to administer . . . for the community."

"Surely no civilized community can resist the conclusion that the killing of man by man as a means of settling international disputes is the foulest blot upon human society . . . "

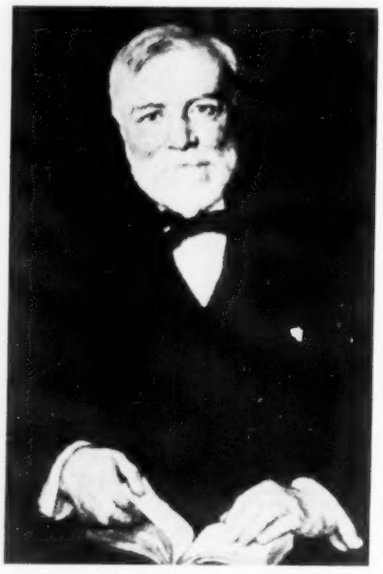
ANDREW CARNEGIE could write, as well as manage steel plants. He wrote a number of books on sociological problems.

As part of the Carnegie centennial celebration, Nov. 25, and 26 and 27, the Carnegie Corporation of New York is presenting to all Carnegie libraries in the United States and British dominions and colonies a reproduction of a portrait of the iron master by Luis Mora, framed for permanent display, and a series of posters bearing epigrammatic statements of Carnegie, selected by his biographer, Burton J. Hendrick.

The accompanying illustration is from the portrait, and the quotations from his books.

Carnegie—whose name is being perpetuated in the Carnegie-Illinois Steel Corp.— gave away $350,000,000 in public benefactions. Between 1881, when he built his first library in Dunfermline, Scotland, his native town, and 1917 when his library gifts ceased, he donated 2811 public libraries to the English speaking world.

Of his public gifts, more than $60,000,000 went for library construction work. These, with 8182 church organs made possible by his



contributions, are usually considered as the more personal of his benefactions. Besides these, his money went for universities, hospitals, medical colleges, public parks, public halls, and churches.

Ceremonies will be held in Carnegie Hall, New York, which he built for the cultural advancement of New York city; in Pittsburgh, Washington, and other cities.

Importing Russian Pig Iron

Russian pig iron is being imported through Philadelphia. In the first week of November 1478 tons came in, port authorities report. A short time previously, a shipment of about 2000 tons was received.

Build Needed Housing; Bring Back Activity in Industry!

BY CHARLES R. HOOK
President, American Rolling Mill Co.

SPEAKING before the annual convention of the Investment Bankers' Association of America, at White Sulphur Springs, W. Va., Oct. 30, Mr. Hook called attention to possibilities of mass production of housing facilities as a means for bringing back re-employment, enlarged incomes and high standards of living in the United States. His remarks are especially apt because of the increasing interest in the use of steel frames to expedite mass production of housing. A portion of his address is presented herewith.

THE great opportunity of this age is to provide more and better homes at greatly reduced cost for the average American citizen.

Every quarter century a new major industry has, through individual initiative, been conceived and developed, which has provided our industrial system with fresh impetus to carry us on to greater development and an improved standard of living.

In my opinion, the development of an integrated housing industry, properly organized for the production of homes, to make the advantages of low cost mass production available to the people, represents the greatest potential development of the times.

Need Financing Plans

Coupled with the industrial production of homes there must be a sound mortgage market, organized on a basis that will encourage home ownership and which will properly protect the interest of both the home owner and those who provide the capital.

I do not make this as a casual observation. For more than a year I have been a member of a group of business men known as the committee for economic recovery, which has made an intensive and exhaustive study, both in this country and in England, of the entire field of home construction and home ownership.

Allie S. Freed, chairman of our committee, spent most of the summer studying the home building program in England. The committee has been conscientiously endeavoring to give those in government the benefit of its best thought with respect to what we believed to be the essentials of economic recovery, which means the re-employment of men in private industry.

Last March the committee completed and made available to leaders in congress and the administration a complete analysis and statistical study with respect to the backlog of manufactured goods waiting for release.

The reception accorded the March report encouraged the committee to make the intensive study of possibilities in the home building field which, as a result of the early studies by the durable goods industries committee and later studies by the committee for economic recovery, seemed to offer the most immediate opportunity for the re-employment of the largest number of the employables.

Charles R. Hook

During the past five years the field of home construction has been one of appealing possibilities, yet little of a really constructive nature has been accomplished.

We have all enjoyed the tremendous social and economic benefits resulting from the wider distribution of goods, made possible by low cost mass production in other fields. As the situation exists today we have no integrated home building industry, but rather a series of widely scattered, unrelated, and unco-ordinated operations, and the high cost of home ownership is directly proportionate to the methods employed.

Lacking the organization and facilities of controlled production and modern merchandising, the cost of home construction has for many years followed an upward trend, so that today the average urban family spends 30 cents or more out of every dollar of its income for shelter.

Although we in America have good reason to feel proud of our past accomplishments, we ought not to close our eyes to the experience of other countries. In England it has been rather generally admitted that the building industry has proved to be the bellwether of prosperity.

Estimates show that one-half of the re-employment in England is attributable, directly or indirectly, to the home-building program. England, with one-third of our population and a background of two and a half million homes built since the war, will build this year about 330,000 dwelling units.

Though there recently has been an uptrend in this country, at our present rate we will construct only approximately 60,000 dwelling units this year which, on a weighted comparative basis, is about 6 per cent of the number constructed in England, where all possible and intellignt steps are taken to encourage this important activity. The British government does not interfere with, but encourages, building by private enterprise.

Potential Market Tremendous

A study projected to 1945 shows that we in America can expect an increase of 5,000,000 families in that period. By adding the accumulated estimated shortage and making reasonable allowances for vacancies and families who cannot aspire to ownership of separate homes, it becomes reasonable to assume that by 1945 our requirements for residential units will total 7,500,000, an average need of 750,000 new homes per year.

With 85 per cent of the families of the nation possessing incomes of less than $3000 per year, it becomes obvious that home building efforts must be planned in conformity with the economic divisions of our population. According to the studies made by the committee for economic recovery, 35 per cent of our homes should not cost over $3000, and 75 per cent of our homes should not cost over $5000.

If we can provide attractive and livable homes within the purchasing power of the masses, there is no question of finding willing buyers.

In the mechanical refrigeration industry, in 1921, with an average unit sales price of $550, only 5000 units were disposed of, at a total sales volume of $2,750,000. In 1934, with a $172 unit sale, 1,368,000 units were sold, aggregating $235,984,000. Still,

(*Please turn to Page* 104)

League Embargoes Manganese to Italy

Washington

WHEN the League of Nations took action recently setting Nov. 18 as the date on which economic sanctions take effect against Italy, according to despatches received at the state department here, manganese ore was included among the commodities not to be exported to Italy.

However, neither iron or steel was on the list. In the meantime, however, Canada has asked the League to include both iron and steel and some other commodities in the sanctions list.

Reports are to the effect that before iron and steel are added, the League intends to contact both the United States and Germany on the basis that if these commodities were added to the list and the United States and Germany did not place them to their embargo list, it would be no use for League members to act independently.

Father Charles E. Coughlin, in a recent radio speech, stated that the United States has an agreement with Great Britain in connection with the League sanctions and that this country will follow the League in this regard. Undersecretary of State William Phillips last week, in the absence of Secretary Hull, stated definitely that this is not so. He insisted that the United States is forming its own policies without consulting or contacting other nations.

There is still the feeling on the part of some government officials that iron and steel and perhaps other commodities will be added to our embargo list, but Secretary Phillips refuses to discuss this.

Labor

NOTHING has developed for publication, but it is generally understood that the wage situation is receiving the earnest consideration of iron and steel producers.

This situation was precipitated when a committee of the employe representation plan of the American Sheet & Tin Plate Co., a United States Steel Corp. subsidiary, recently requested an increase of 15 per cent. This was denied. No statement has been made in regard to the disposition of a similar request by employes at the Aliquippa, Pa., works of the Jones & Laughlin Steel Corp.

The rising cost of living, and broader operations which have put most steel producers in the profit area, although by a narrow margin thus far, complicate matters. Producers believe the remedy is an increase in the number of hours per week which would be a natural consequence of recovery, rather than boosting hourly rates.

With the American Federation of Labor threatening a drive to organize the steel industry, the avoidance of causes for irritation is highly desirable. The emphasis of organizers in the steel industry, as also recently in the automotive industry, is upon annual income rather than hourly rates.

The depression low of common labor hourly wage rates in the iron and steel industry was 33.6 cents, which came into effect with a 15 per cent reduction on May 16, 1932. On Aug. 19, 1933, when the steel code became operative, there was an increase to 40 cents an hour. On April 1, 1934, a 10 per cent advance put wages up to 44 cents per hour, where they now stand.

Increased prices for finished products are expected to be the sequel to the rising market on semifinished material, but producers point to these increases as being necessitated by higher cost of production arising from the stiffer scrap and pig iron markets.

There is some belief that producers will take some action before the end of the year.

Alloys Tailor-Made for Specific Purpose

THE metallurgist of today makes up alloys to order just as a pharmacist compounds prescriptions, according to Dr. John Fairfield Thompson, vice president of the International Nickel Co., New York, in a paper before the seventh international congress of mines, metallurgy and applied geology, in session in Paris last week.

Writing on "Ten Years' Progress in the Metallurgy of Nickel", Dr. Thompson said:

"World consumption of nickel reached an estimated 124,000,000 pounds in 1934, and of this amount only 27 per cent was used as pure nickel. Thus, 90,000,000 pounds of the metal went into alloys of one kind or another last year.

"Once we approach this field we find that there has been a development of tremendous significance. It is the mutual recognition by workers in metals on the one hand and by designers and industrialists on the other hand, that an almost limitless variety of alloys can be 'custom-built' to meet the specific requirements of given applications.

"To a marked degree the modern metal worker can compound an alloy to exact prescription, and consequently the designers and engineers are released to dare and to do things which were thought impossible less than ten years ago."

Dr. Thompson headed the delegation of the Mining and Metallurgical Society of America to this congress,

Dr. John F. Thompson

and he also was a delegate of the American Institute of Mining and Metallurgical Engineers.

Meetings

PURCHASING AGENTS' association of Chicago will hold its annual exposition of members' and advertisers' products at the Hotel Sherman, Nov. 20 and 21. Noonday meetings will be held on these two days.

Milton J. Blair, vice president, J. Walter Thompson Co., Inc., will speak on Nov. 20 on "Value of Advertising," while L. E. Frailey, editorial director, the Dartnell Corp., Chicago, will discuss "The Forgotten Salesman" at the Nov. 21 meeting.

A banquet on the evening of Nov. 21 will close the exposition.

Safety

COLORADO FUEL & IRON CO., Denver, won national first and grand prize through the team from its wire mill at Pueblo, Colo., at the safety conference of the United States bureau of mines at Salt Lake City, Oct. 5. It scored 99.75 per cent in the grand competition, against 99.62 per cent by a team from the Consolidated Copper Co. works.

Production

REFLECTING lighter schedules at Pittsburgh, Cleveland, Buffalo, Birmingham, and Detroit, steelmaking dropped back 1½ ponits to 53 per cent, surrendering practically all of the gain in the previous week. The only districts to record a gain last week were Chicago and eastern Pennsylvania, with Youngstown, New England and Wheeling held steady. Further details follow:

Buffalo—Sagged 5 points to 37 per cent last week, with some improvement looked for toward the end of the month. Fourteen open hearths are in production.

Youngstown—Held at 63 per cent last week. The Ohio works of the Carnegie-Illinois Steel Corp. is operating 13 open hearths, Republic temporarily is operating 9 at Youngstown and 7 at Warren, and is planning to place a tenth unit on the active list when repairs are completed, while Youngstown Sheet & Tube Co. continues to operate 11 furnaces at its Campbell works.

Detroit — Off 6 points to 88 per cent. One producer is now operating seven of eight open-hearth furnaces, and a second mill, eight of nine.

Pittsburgh — Off 3 points to 44 per cent last week, due largely to a 5-point decline by the leading interest. The operating rate of the leading independent continues steady at around 60 per cent.

Out of 60 steelworks blast furnaces here, 26 continue to operate. The active list includes 11 for Carnegie-Illinois Steel Corp., and 1 each for American Steel & Wire Co. and National Tube Co. Of the independents, Jones & Laughlin Steel Corp. has eight on; Bethlehem Steel Co., three, and Pittsburgh Steel Co. and Pittsburgh Crucible Steel Co., one each.

Wheeling — Unchanged at 84 per cent last week, with 31 out of 37 open-hearth furnaces operating among four district plants.

Central eastern seaboard — Up slightly to 39 per cent, with indications pointing to a further advance in the near future. Likelihood of a general increase in finished steel prices, effective not later than Jan. 1, is expected to drive in considerable tonnage to augment the already expanding volume of new business.

New England — Held at approximately 70 per cent last week, with a gain expected this week, owing to two works scheduling heavier operations.

Chicago — Rose ½ point to 55½ per cent, the second consecutive upturn. Steady operations are in immediate prospect, though repair work by one leading interest may necessitate a rather substantial decrease in open-hearth schedules late this month. Nineteen of 41 blast furnaces continue active.

Cleveland-Lorain — Off 3 points to 69 per cent, Otis Steel Co. dropping one open hearth to operate seven; Republic Steel Corp.'s Corrigan-McKinney division continuing with ten, and National Tube Co., Lorain, ten.

Birmingham — Off fractionally to 58 per cent last week. Two blast furnaces were blown in at Ensley. Three open hearths were taken off at Fairfield. Rail rolling has started at the Ensley works and will continue for about eight weeks.

Steelmaking Operations

Percentage of Open-Hearth Ingot Capacity Engaged in Leading Districts

	Week ended Nov. 9	Change	Same week 1934	Same week 1933
Pittsburgh	44	— 3	20	23
Chicago	55½	+ ½	30½	29
Eastern Pa.	39	+ ½	20½	18½
Youngstown	63	None	31	21
Wheeling	84	None	39	38
Cleveland	69	— 3	43	46
Buffalo	37	— 5	26	21
Birmingham	58	— ½	25	20
New England	70	None	40	75
Detroit	88	— 6	48	37
Average	53	— 1½	27½	24

ERIE MALLEABLE BORROWS

Erie Malleable Iron Co., Erie, Pa., through its receiver has been granted federal permission by Judge F. P. Schoonmaker in federal district court in Pittsburgh to borrow $35,000 required to pay operating expenses. Funds were needed immediately pending action on an application to the RFC for a $350,000 loan in connection with reorganization.

October Ingots Up; Best Since 1929

PRODUCTION of steel ingots in October, 3,116,184 gross tons, was 110 per cent greater than in October, 1934, and the largest October tonnage since 1929, when 4,534,326 gross tons were turned out, according to statistics of the American Iron and Steel institute, New York.

The October output carries the production for the first ten months of 1935 to 27,160,260 gross tons, which is six per cent greater than the tonnage for all of 1934, which was 25,599,118 gross tons.

The daily rate of ingot production in October was 115,414 gross tons, the largest since February, 1935, when the rate was 115,740 gross tons. Except for February the October rate was the highest since June, 1934, when the rate was 117,672 tons.

In October 52.13 per cent of capacity was engaged, compared with 51.13 per cent in September, and 24.93 per cent in October, 1934. The per cent of active capacity also is the largest since February, 1935.

Steel Ingot Production

Monthly Production—Complete for Bessemer; Open Hearth, Calculated from Reports of Companies Making 97.91 per cent

	Open Hearth Gross tons	Open Hearth Per cent of capacity	Bessemer Gross tons	Bessemer Per cent of capacity	Total Gross tons	Total Per cent of capacity	Calculated daily production, all companies (gross tons)	Number of working days
1935								
Jan.	2,631,673	49.73	239,858	34.99	2,871,531	48.04	106,353	27
Feb.	2,553,429	54.28	224,336	36.82	2,777,765	52.28	115,740	24
Mar.	2,637,331	51.75	230,810	34.97	2,868,141	49.83	110,313	26
Apr.	2,408,588	47.27	231,916	35.14	2,640,504	45.87	101,558	26
May	2,381,061	44.99	254,796	37.17	2,635,857	44.10	97,624	27
June	2,020,406	41.23	210,487	33.17	2,230,893	40.31	89,236	25
July	2,045,768	40.15	224,456	34.01	2,270,224	39.44	87,316	26
Aug.	2,685,965	50.76	233,361	34.05	2,919,326	48.84	108,123	27
Sept.	2,596,098	52.98	233,737	36.83	2,829,835	51.13	113,193	25
Oct.	2,845,465	53.77	270,719	39.50	3,116,184	52.13	115,414	27
10 mo.	24,805,784	50.93	2,354,476	37.11	27,160,260	49.37	109,303	260
1934								
Jan.	1,824,640	34.69	172,489	25.17	1,997,129	33.59	73,968	27
Feb.	2,036,071	43.55	175,873	28.87	2,211,944	41.86	92,164	24
Mar.	2,594,536	49.33	203,904	29.75	2,798,440	47.07	103,646	27
Apr.	2,678,582	55.00	257,482	40.57	2,936,064	53.34	117,443	25
May	3,067,874	58.33	331,620	48.38	3,399,494	57.18	125,907	27
June	2,776,891	54.83	282,592	42.81	3,059,483	53.44	117,672	26
July	1,369,584	28.12	119,869	18.89	1,489,453	27.06	59,578	25
Aug.	1,271,752	24.18	109,598	15.99	1,381,350	23.24	51,161	27
Sept.	1,151,362	23.64	117,615	18.53	1,268,977	23.05	50,759	25
Oct.	1,354,113	25.75	127,789	18.64	1,481,902	24.93	54,885	27
10 mo.	20,125,405	33.55	1,898,831	24.29	22,024,236	32.48	71,525	260
Nov.	1,478,566	29.19	132,059	20.01	1,610,625	28.13	61,947	26
Dec.	1,832,790	37.63	131,467	20.72	1,964,257	35.68	78,570	25
Total	23,436,761	38.68	2,162,357	27.39	25,599,118	37.38	82,312	311

Capacity percentages for 1935 are based upon open-hearth capacity of 60,954,717 tons and bessemer of 7,895,000 tons on Dec. 31, 1934; for 1934 based on open-hearth capacity of 60,583,813 tons and bessemer of 7,895,000 tons on Dec. 31, 1933

Financial

WITH the addition of the American Rolling Mill Co. and the Colorado Fuel & Iron Co., both integrated producers, and Spang, Chalfant & Co., producers representing 85 per cent of the country's ingot capacity have reported for the third quarter and the first nine months of 1935.

Relating the experience of this 85 per cent, which is detailed in the revised table at the bottom of this page, to the entire industry it is now evident that the profits for the third quarter for all producers will top $8,000,000 slightly. On the same basis, the profit for the first nine months of 1935 for the entire industry is about $30,600,000.

Nine more leading consumers of iron and steel issued their quarterly reports during the past week, as shown in the accompanying table, and their showing combined with 48 previously reported is a virtual doubling of earnings over last year.

DAVISON REORGANIZATION PLAN CUTS INTEREST TO 5%

Davison Coke & Iron Co., Pittsburgh, is offering a reorganization plan, under which first mortgage bondholders will take a reduction in interest from 6 to 5 per cent. Preferred claims of creditors, amounting to $231,264, will get $57,874 cash, $173,400 of new notes, and 4334 shares of stock. Unpreferred claims of creditors, amounting to $144,418, will get new debentures of equal amount and 2846 shares of stock. Holders of $1,910,700 in notes will get the same amount in new debentures and 38,214 shares of stock.

Common stockholders will get one share of new capital stock for each ten shares now held. Prior preferred stock will get new capital stock at the rate of 6.975 shares for each preferred share. Preferred stock will get three shares of new capital stock for each present preferred share.

Davison company's income account for nine months of 1935 shows net profit of $143,026, before charging surplus with $717,721 loss on abandonment of the Leetonia, O., blast furnace. Current assets, as of Sept. 30, including $262,833 cash and $604,179 accounts receivable, were $2,758,897, against current liabilities of $3,663,139. Current liabilities include notes of $1,910,700 presently due.

FRAME NEW MACKINTOSH PLAN

A rehearing of the bankruptcy proceedings of the Mackintosh-Hemphill Co., Pittsburgh, has been set for the week of Dec. 2, by which time the company expects to present a skeletonized plan of reorganization. An outside interest has offered $900,000, or 80 per cent on the present bonds and preferred stock, and the management is contesting the offer and seeking recourse in bankruptcy in order to protect common stockholders.

CALL MERCER PRICE TOO LOW

Objections filed by the Fidelity Trust Co., Pittsburgh, have halted the proposed sale of the Mercer Tube & Mfg. Co. to a Long Island, N. Y., purchaser on a bid of $76,000. Objectors state that the receivers—D. V. Sawhill and D. M. Naismith—have operated the plant since February, 1935, with net profits in excess of $90,000. Present appraised value of the plant is $206,879.

Profits of Steel Consumers Far Outrunning 1934

All Figures Are Profit Except Where Asterisk Denotes a Deficit

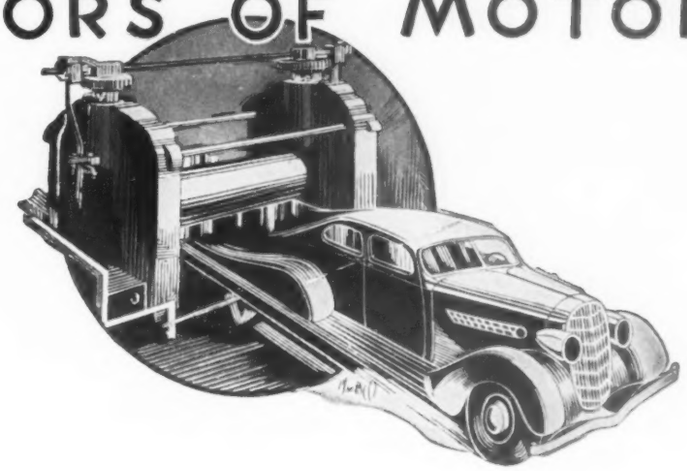
	Third Quarter		Nine Months	
	1935	1934	1935	1934
Timken Roller Bearing Co., Canton, O.	$1,297,857	$423,212	$5,820,136	$2,999,506
Reliance Mfg. Co., Chicago	.....	.....	128,399	111,801
Walworth Co., New York	*84,099	*138,514	*303,649	*3,756
Electric Auto-Lite Co., Toledo, O.	436,752	231,957	1,778,752	1,267,477
Holland Furnace Co., Holland, Mich.	616,243	260,341	.....	.....
Murray Corp. of America, Detroit	.....	.....	1,129,000	55,662
Fairbanks Co., New York	*21,040	*42,798	.....	.....
Atlas Tack Corp., Fairhaven, Mass.	.....	.....	58,743	27,636
Marlin-Rockwell Corp., Jamestown, N. Y.	212,525	30,767	.....	.....
Total	2,458,238	764,965	8,611,381	4,458,326
Previous total of 48 similar companies	18,370,747	9,079,579	64,530,246	39,048,268
Grand total 57 companies	20,828,985	9,844,544	73,141,627	43,506,594

Further Returns from Steel Producers Show Big Gains in Earnings over 1934

All Figures Are Profit Except Where Asterisk Denotes a Deficit

	Third Quarter 1935	Second Quarter 1935	Third Quarter 1934	Nine Months 1935	Nine Months 1934	Ingot Capacity Gross Tons
United States Steel Corp.	$1,305,205*	$762,493*	$9,826,767*	$4,241,499*	$11,466,000*	27,341,900
Bethlehem Steel Corp.	701,616	1,800,909	2,400,126*	1,895,227	139,473	8,980,000
Republic Steel Corp.	507,731	922,329	2,998,600*	3,264,295	2,193,158*	5,013,000
Jones & Laughlin Steel Corp.	233,914	44,412	1,826,227*	516,463*	2,864,499*	3,671,200
Youngstown Sheet & Tube Co.	574,799	124,758	1,257,371*	103,787	1,668,633*	3,120,000
National Steel Corp.	2,287,763	3,191,169	347,199	8,603,758	4,582,896	2,232,000
Inland Steel Co.	1,810,203	2,392,510	53,476*	6,668,509	3,108,258	2,000,000
American Rolling Mill Co.	552,137	1,087,529	564,229*	3,011,140	1,453,919	1,807,600
Wheeling Steel Corp.	648,597	668,300	930,788*	2,251,468	145,390	1,500,000
Colorado Fuel & Iron Co.	10,234	47,527	446,836*	109,252	195,624	888,000
Otis Steel Co.	27,367*	435,493	445,402*	1,360,488	563,308	872,000
Allegheny Steel Co.	246,009	176,592	34,133*	746,746	625,701	482,000
Gulf States Steel Co.	58,433	66,662*	205,374*	21,919	13,571*	400,500
Granite City Steel Co.	102,824	177,792	46,314*	415,198	153,931	400,000
Wickwire Spencer Steel Co.	4,655	89,142*	229,886*	160,269*	297,859*	150,000
Ludlum Steel Co.	118,199	147,014	7,571	518,820	442,436	38,000
Superior Steel Corp.	39,206*	31,289*	157,177*	32,525*	169,119*	.....
Acme Steel Co.	384,479	338,348	13,846*	1,319,817	867,532	.....
Eastern Rolling Mill Co.	68,760*	111,296*	187,651*	175,424*	213,465*	.....
Spang, Chalfant & Co.	177,913	.....	39,932*	717,544	621,912	.....
Total	6,978,968	10,493,800	21,309,365*	25,881,788	5,985,924*	58,895,600

MIRRORS OF MOTORDOM



DETROIT

THERE isn't a secret over any of the new automobiles right now—in other words, it's show time. Whatever you've heard rumored as "coming" for some months can now be seen in the flesh—or, to be more precise, in steel. If the heavy Sunday automobile supplements haven't already proclaimed the fact, the automobile industry's three-ring circus is now visibly swinging through the western circuit.

Following the New York show last week, Detroit this week, and then a stand in Chicago, the new cars will have shaken hands with the buying public.

By Thanksgiving should come the acid test for most of the motor makers. A majority will come into December with their field stocks built up and order pads out, pencils primed.

There still is a strain of thought here that even the best laid plans of mice and men may go oft astray. Though the preconceived thought was to eliminate the curves in production, this same line of reasoning says that people will not buy cars in the winter months, and curves' dips may only be ironed out.

Santa Claus Will Help

On the other hand, car sales will get a big boost this year by having new models out for sale to the Christmas trade. A continuation of warm weather will be a big help, plus the growing freeness of people to spend. Some states permit 1936 licenses now on new cars.

These latter facts tend to tip the scales noticeably. No wonder Detroit oozes optimism for an 800,000-car final quarter. October took 260,000 cars of that; November will take 350,000, leaving December on the slate for 250,000.

Detroit points optimistically to the fact that during 1931 and 1932 more cars were scrapped than were produced. That shortage has not yet been made up. Furthermore, the automobile five years old or less is now 40 per cent less in number than it was in 1929.

Once the field is stocked, however, car makers will have to work on orders. There is no avowed intent to build up a lot of finished cars and store them country-wide for a booming spring of 1936.

Rather, the General Motors plan will be followed. Last week G. M. stated "that it had set aside a stabilization fund of $60,000,000 to further equalize employment by accumulating parts' inventories."

Sixty millions for parts, and figuring about $600 per General Motors car, means parts for about 100,000 cars. Of course, this is presuming parts' inventories will be carried on a proportionate basis.

Expand Storage Space

To do this, General Motors has been planning ahead for some time. Chevrolet alone is adding space, mainly storage, as follows: 219,000 square feet at Kansas City; 148,900 square feet at Tarrytown, N. Y.; 95,000 square feet at Flint, Mich.; 60,000 square feet at Kansas City; 50,320 square feet at St. Louis; and 6000 square feet at Buffalo.

At Indianapolis, 470,400 square feet are being added for commercial body manufacture, including considerable storage space. A share of the Baltimore expansion, completed last April, coincides with the General Motors parts' building program.

Pontiac is another subsidiary that has tacked on considerable storage facilities, mostly at Pontiac, Mich.

"Steel trusses make possible the bridge, the airplane fuselage, the Marconi tower—structures of light weight but great strength. Steel trusses underlie the flowing curves of this new automobile." So did Lincoln pay a glowing tribute to steel, in the announcement of its new Zephyr models.

"The driver is enclosed in a fortress of steel"—so Chevrolet in playing up safety gives steel a boost. Steel above, below, and all around is a thought not only Chevrolet but also Olds and other General Motors turret-toppers are hitting hard.

Plymouth plays on alliteration in hyphenating "safety" with "steel" by widely proclaiming that the "1936 Plymouth has a Safety-Steel body reinforced at five main points."

Pontiac went to a steel floor this year; Nash prominently says "all-steel top, steel floor and steel body with girder-steel frame." Scarcely an automobile ad this year that does not give steel a pat on the back.

Little wonder, in fact, that one automobile purchasing agent has expressed himself that the automobile industry—of all the steel industry's customers—is doing the steel industry's biggest merchandising job.

In the break-down analysis, steel at least equals its dominating percentage of any former year out of all materials used in the 1936 cars. In some cases, steel has taken on a greater prominence this year in the car's material makeup.

Plymouth, with its deeper frame is a heavier user of steel in 1936 than in 1935. Chevrolet's Standard models, 2 inches longer in wheelbase and 135 pounds heavier, obviously use more steel.

The swingover that General Motors and others have made to the steel top involves from 30 to 40 pounds more steel per car than formerly.

Comparing Price Trends

Withal, the American Iron and Steel institute, studying price trends, shows that whereas sheet steel prices have dropped 45 per cent between 1926 and 1933, and in 1934 were still 35.5 per cent below 1926, the index of average automobile prices in 1934 was only 4 per cent beneath 1926.

Speaking of materials, Plymouth says it will use 80,000,000 pounds, or 40,000 tons, of rubber in its 1936 building program. Every Plymouth, exclusive of tires and tubes, now has

400 rubber parts, totaling 50 pounds per car.

Behind the glitter of the shows, the engineering and design departments of Detroit's major industry go on working as though nothing were happening.

Their work at present is on 1937 and even 1938 cars. One harbinger of what's ahead in the years to come for a "production" car lies in the recent announcement of Stout Motor Car Corp., Dearborn, Mich.

Stating that "demonstrations are upon invitation only," Stout is laying plans to confine its 1936 production to 100 cars, priced at $5000 and up f.o.b. Dearborn.

The Stout "Scarab" is, of course, rear-engine drive, without chassis and with loose chairs, adjustable to any position. Each wheel is individually sprung, maximum brakes are in the rear, door locks are electric without handles, there is an inside floor area of 7 feet 6 inches by 5 feet 7 inches. Forced draftless ventilation, with an air filter, is employed.

Pondering New Ideas

Speaking of air filters, both Carrier Engineering and Houde Engineering are working on the air-conditioning idea for cars, principally buses at first, and have had several successful installations.

A Pittsburgh inventor has a pneumatic automobile spring, claimed to be superior to the steel spring. It consists of four rubber air-filled units, placed in the position of the present leaf spring. Tubing interconnects each. Air under pressure absorbs shocks.

Seating will come in for some play in the near future. The Lincoln Zephyr and Chrysler Airflow have been touching on the problem in their bridge deck design of frame. Under this type of construction it is claimed that the deck type frame carries the major portion of the seat weight, rather than the wheels.

Some time ago Briggs Mfg. Co. experimented with the use of chairs constructed with seamless tubing frames affixed to the car's floor as an approach to easier riding qualities. However, this method did not cope with side sway.

A Northern Ohio maker of welded steel tubing is now experimenting with the use of seats for buses with frames of modernistic style tubing with the thought that flexing of the frames will dampen vibration.

Production news was all to the uptrend last week. Chevrolet announced that it would schedule around 100,000 jobs monthly "to keep pace with demand that is evident." Ford last week was hitting close onto 5000 assemblies a day Plymouth showed gains to make around 11,000 for the week.

Even the Lincoln plant began to take on life as around 200 jobs rolled off the lines for the week. The new Lincoln-Zephyr, incidentally, is to be sold through Lincoln dealers, of which at last count there were around 750 over the country, but that total is being added to daily. Ford dealers can sell the new Zephyr, but must be content with only a 5 per cent commission and must turn the order over to a Lincoln distributor for filling.

Graham, delayed until it ran off 1500 to 1800 of the expiring 1935 lines to care for a strong demand just at the season's close, has just begun assembly on the new sixes which, incidentally, will be equipped with superchargers.

Olds, Pontiac Still Rivals

Last week, Detroit heard that Olds and Pontiac had given releases to Fisher on bodies each in the same number. Both, evidently, will begin the 1936 campaign with the same start and both last week were running off between 3700 and 4000 jobs weekly. Detroit is interested in the family rivalry of Olds and Pontiac, recalling how 1934 was a Pontiac year; 1935, an Olds year. By last week, Pontiac and Olds each had about 20,000 1936 jobs made and were planning to have 50,000 apiece completed before the first of the coming year.

Buick, with dealers well stocked by now, is leveling off at the 3500-unit per week mark. Hudson, noting a growing demand for Hudsons proportionate to Terraplanes, was doing 500 daily last week.

Automobile Production

Passenger Cars and Trucks—U. S. Only
By Department of Commerce

	1933	1934	1935
Jan.	128,825	155,666	292,817
Feb.	105,447	230,256	335,700
Mar.	115,272	338,434	429,834
Apr.	176,432	352,975	477,746
May	214,411	330,455	364,727
June	249,727	306,477	361,321
July	229,357	264,933	337,044
Aug.	232,855	234,811	240,051
Sept.	191,800	170,007	89,805
Oct.	134,683	131,991	*200,000
10 mo.	1,768,809	2,516,005	3,129,045
Nov.	60,683	83,482	.....
Dec.	80,565	153,624	.....
Year	1,920,057	2,753,111	.....

*Estimated.

Estimated by *Cram's Reports*

Week ended:

Nov. 2	76,740
Nov. 9	89,095

This Poem Praising Steel Offers a Wide Appeal

A few weeks ago, after the George A. Fuller Co. placed an order for fabricated steel for the new department of interior building in Washington with the Lehigh Structural Steel Co., Mrs. Alva J. Myers, Washington representative of Lehigh, was moved to poetry, as follows:

STEEL

As Nature made the mighty Oak,
Strong, sturdy, hard and real,
So man created in his turn,
A metal he called Steel.

This Oak has been for ages past,
A monarch of them all,
The structures built of Steel will stand
When other structures fall.

Though tide and time and wind and rain,
A harmful blow may deal,
The years have proven to mankind,
The worth of sturdy Steel.

From mill to shop, from shop to site,
With speed, with zest, with zeal,
Is shipped by rail, by ship, by truck,
This metal known as Steel.

So stop and think, you Engineers,
Before you set your seal,
Be sure you're playing safe the game,
Design in Structural Steel.

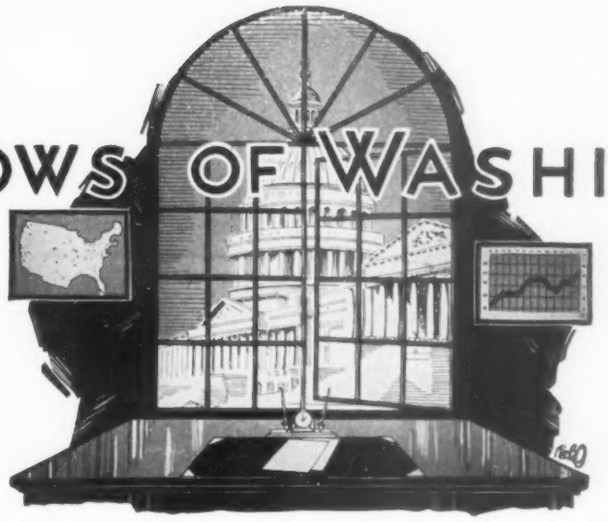
October Blast Furnaces Near 1934 High Point

Actual production of coke pig iron in the United States in October totaled up to be substantially the same as reported in STEEL last week, page 27, in spite of the fact that the preliminary compilation incorporated estimates made by many blast furnace operators for the last day or two of the month. The most important revision was in the total of furnaces making iron on Oct. 31, the actual figure being 116 instead of 114, as reported.

The actual average daily production for October was 63,818 gross tons, a gain of 4809 tons, or 8.2 per cent, over the September daily rate of 59,009 tons. Total production was 1,978,379 tons, which compared with the 1,770,259 tons of the preceding month, was an increase of 208,120 tons, or 11.8 per cent.

The increase in the number of active blast furnaces on the last day of the month was brought about by the resumption of two furnaces, previously unreported. These were Youngstown No. 5 stack of the Republic Steel Corp. in Ohio, and Ensley No. 5 of the Tennessee Coal, Iron & Railroad Co. in Alabama. The October total of 116 was only one furnace less than that for the best month in 1934—117 stacks in blast on May 31.

WINDOWS OF WASHINGTON



WASHINGTON

THE die is cast. In spite of all kinds of arguments against it, Maj. George L. Berry, co-ordinator for industrial co-operation—whatever that may possibly mean—has called an industrial-labor conference to be held in this city beginning Monday, Dec. 9.

Major Berry, with his dream of a meeting of perfect harmony between capital and labor, is either trying to make himself believe the conference will be a success or trying to fool people into believing that he thinks this a possibility.

The Major has about given up hope that the steel, automobile, and some other leading industries will attend the conference; he said as much at a meeting with the press last week at which time he made a desperate effort to make the gentlemen of the press believe that he knew what it was all about—even if no one else does.

Slightly in the Dark

Questioned repeatedly by some fifty newsmen for a period of an hour, Major Berry, in answer to the question as to what the meeting could possibly accomplish, one minute said it could go on record either for or against permanent NRA legislation and in the next breath said that he had not the slightest idea that that subject would even be taken up.

It is perfectly obvious to those who have been watching the trend of this conference that there is nothing the conference could possibly do but go on record either for or against legislation either in the nature of a permanent NRA or some other similar law.

Asked what the administration would do if the conference voted either for or against permanent legislation, Major Berry replied, "I don't know."

At one time he did say that he thought the administration would take some steps as the result of a report at the conference by industry, but he forgets that the President has taken no notice whatsoever of the Roper business council composed of some of the leading industrialists of the country.

Major Berry said he hopes that some kind of a permanent council may come out of this general conference. The present plan is to have a large open meeting, followed by conferences of related industries—management to have separate conferences from labor.

He stated that there will be sixty related group meetings, meaning 120 such meetings with labor having its own. Each of these group meetings is to prepare a plan and appoint a spokesman who will then become a member of the so-called council, to be composed of 120 persons.

Holds Response Favorable

All of the plans submitted by the 120 group meetings will be co-ordinated by this council and some definite action taken, if possible. It seems probable that the conference will last as long as a long session of congress.

In a communication which Major Berry is sending to industry, announcing the date of the conference, he states that the response to his first letter was "quite overwhelming and far exceeded my expectations. Seventy-three per cent of the replies are unqualified acceptances of the invitation to attend the discussion. Twenty-three per cent have classified as noncommittal—the writer either wanted to know more about the program or was obliged to delay his reply until the proposal could be discussed with his associates. Only 4 per cent can be regarded as expressing opposition to the plan."

The situation at NRA becomes more chaotic every day.

Major Berry is building up a small organization within the NRA itself. He has surrounded himself with a large number of lieutenants, all of whose offices adjoin his, and it is impossible to even talk with one of these subordinates without first being announced through the main Berry office.

One of the things the organization is now trying to do is to cut down the salaries and personnel at NRA. That is supposed to be a part of Major Berry's job. Just to show how it works:

Major Berry has a personal friend among the newspaper men—a young man connected with one of the larger press associations who has covered NRA for some time. The major has taken this man on as his personal publicity man at a salary of $6800 per year. The report is, and it probably is true, that this man has been making $3000 a year.

In this connection this man, at one and the same time, covered NRA for his press association and did the job as publicity man for Major Berry. This went on until it was exposed by one of the Washington newspapers. It should be said in justice to the press association, however, that it knew nothing about the arrangement.

To Interpret Voice of Industry

Speaking last week here before a convention, Major Berry said that "industry in this country is like the unacknowledged, unsponsored orphan boy. Your representation in that matter of solidarity of purpose is just about negative—just about zero. I am proposing to make effective the voice and the expression of industry of this country, and when I say industry I not only mean management and the stockholders but I mean the labor engaged in industry with you and who are your partners."

In connection with the coming conference, Major Berry said:

"It is going to be industry's party. There is to be no speech making or paper reading. It is going to be a conference of men whose community of interest is so obvious that there can be no serious question as to that statement.

"I am going to ask the industrial groups of this country, related groups, to sit down and write their ticket without interference of a government official or of politicians, but a group of

those who are engaged in related industries, will prepare their program and select a man as an ambassador to transmit the conclusions of the groups.

"These ambassadors, I hope, will form the permanent institution from which we will have the rare experience of submitting something jointly, if it is to be submitted, to the congress of the United States, that will meet our requirements. If we fail in this task, we shall be compelled to acknowledge that we don't know what we want, and that our future destinies are in the hands of the politicians.

"Those who do not want to participate in the discussion in frankness, without obligation, of the problems of industry, those who are not aware that the same disease—cutthroat competition—is with us again, those who are not willing to appreciate that disintegration even in this period of prosperity and stability can occur, will disregard it, and then I don't know whether we can claim to be industrial statesmen or not."

It developed Friday that Major Berry has worked out a preliminary related group list for the Dec. 9 conference. Associated with iron and steel producers will be structural fabricators and manufacturers of bolts, nuts, forgings and other steel products.

It also came to light Friday that while industry may come to the Berry conference without a program, labor will have a three-point program—endorsement of the Black 30-hour week bill, the Walsh bill imposing NRA standards on government contractors, and the Mahoney bill requiring federal licensing of industry.

National Association of Manufacturers, New York, last week began taking a referendum among its membership to plumb sentiment for and against a new NRA. It appeared probable that the Berry conference would be widely discussed at the association's congress of American industry at the Commodore hotel, New York, Dec. 4-5.

FTC REITERATES STAND AGAINST PRICE-FIXING

The federal trade commission has definitely set itself against the inclusion of price fixing paragraphs in any trade practice rules. It was a foregone conclusion that it would do this, and it therefore seems strange that any group should have attempted it.

The commission has announced that it has disapproved trade practice conference rules for retail automobile dealers, as proposed by representatives of the trade, "for the reason that four of the six rules proposed embodied an illegal price fixing arrangement and would tend to unreasonably restrain trade."

SHANNON LEAVES NRA

R. W. Shannon, at one time with the American Sheet & Tin Plate Co., a deputy administrator of NRA in charge of the steel code and who recently has been supervising the steel survey for the temporary NRA, resigned last week. He is now associated with Paul & Beekman Mfg. Co., Philadelphia, metal stamping manufacturer.

Notwithstanding that the steel survey was not completed prior to Mr. Shannon's leaving, it is insisted by NRA officials that it will be ready for the President early in December.

ROPER TO KEEP COUNCIL

Secretary of Commerce Roper conferred recently with the President in connection with the continuation of his business advisory council, from which there have been numerous resignations the past few months.

The next meeting of the council will be held here, Dec. 4 and 5. The steel industry is represented on this council by Myron T. Taylor, chairman of the United States Steel Corp.

"The council will continue to function in its advisory relationship to this department," Secretary Roper said. "It will study business legislation."

Institute "Observer" Is Likely at NRA Conference

New York

Attitude of the American Iron and Steel institute toward the meeting called by Maj. George L. Berry, NRA co-ordinator for industrial co-operation, for Dec. 9 relative to the future of NRA, probably will be revealed following the regular monthly meeting of Institute directors Nov. 14.

Major Berry in a recent statement listed the steel industry as "uncertain" in its attitude. This uncertainty is attributed to correspondence in which it is understood that the Institute opposed a general conference such as originally suggested, and while expressing interest with possibilities of small group meetings it was nevertheless noncommittal as to the extent to which it would co-operate. However, the institute wished Major Berry to keep it advised of future plans.

Should the Institute not actively participate in the proposed meeting, it is considered more than probable that it will at least have an unofficial observer present.

Died:

JOHN C. MALONE, 41, manager of the Gary, Ind., plant of Union Drawn Steel Co., in New Matamoras, O., Nov. 2. Starting with the millwright crew at the age of 16, he had spent his entire business life with Union Drawn; as assistant superintendent of the No. 2 plant in Beaver Falls, Pa., later as assistant plant manager at Hartford, Conn., from where he was transferred to Gary in 1927, becoming manager in 1932.

♦ ♦ ♦

Harry F. Bates, for 25 years associated with Elwell-Parker Electric Co., Cleveland, in that city, Nov. 3.

♦ ♦ ♦

William H. Keim, 66, for 30 years treasurer of the John S. Oram Co., Cleveland, cooperage machinery, in that city, Nov. 5.

♦ ♦ ♦

George M. Getschow, 66, president of the Phillips-Getschow Co., heating contractor, and secretary of the Sloan Valve Co., both of Chicago, in that city, Nov. 2.

♦ ♦ ♦

Charles V. Bennett, 71, vice president and secretary of the Pierce, Putler & Pierce Mfg. Co., now in process of reorganization, in Syracuse, N. Y., Oct. 31.

♦ ♦ ♦

Henry L. Peabody, 78, for 25 years superintendent of construction for the Cleveland Frog & Crossing Co., Cleveland, in Berlin Heights, O., Nov. 3. He had been retired for several years.

♦ ♦ ♦

Joseph Thompson, 56, who in 1930 retired as general manager of the Hammond, Ind., plant of Standard Steel Car Co., where he had worked for 21 years, in Phoenix, Ariz., Nov. 6.

♦ ♦ ♦

Donald P. Doyle, 39, since 1927 controller for General Cable Co., White Plains, N. Y., in that city, Oct. 29. At one time he was associated with Sterling Products Co., Cleveland.

♦ ♦ ♦

Frederick E. Schenck, 91, about 40 years ago secretary and treasurer of the former United States Iron & Tin Plate Co., Pittsburgh, in that city, Nov. 3. He had been retired for a number of years.

♦ ♦ ♦

Irwin S. Osborn, 57, vice president and a director of C. O. Bartlett & Snow Co., Cleveland, in that city, Nov. 2. He was an expert in problems of municipal wastes disposal, and joined Bartlett & Snow in 1922.

♦ ♦ ♦

Frank Orth, 67, inventor of the Orth ribbed roof for open-hearth furnaces, in East Chicago, Ind., Nov. 1. Although this type of roof is in practically universal use today and Mr. Orth held patents on it, he never received royalties.

♦ ♦ ♦

Leo G. Smith, 57, president of the Stainless Steel Castings Co. of America Inc., Milwaukee, Oct. 30. Born in Oil City, Pa. he went to Milwaukee in 1912, and after many years of association as operating executive with several leading steel foundries, he organized his own company a year ago.

Industrial Men in the News

Jerome Strauss, Vice President in Charge of Research and Development, Vanadium Corp. of America

A graduate of Stevens Institute of Technology, he acquired his first industrial experience with the Illinois Steel Co.

During the World war he was active in various capacities in the ordnance department of the United States Army.

In previous associations he held posts of chemist and metallurgist, chief chemist, materials engineer and chief research engineer.

JEROME STRAUSS, who recently was elected vice president in charge of research and development for the Vanadium Corp. of America, Bridgeville, Pa., has been affiliated with the company 7 years.

He is a graduate of Stevens Institute of Technology, with a degree in mechanical engineering. Following college, Mr. Strauss went with the Illinois Steel Co. at the South works, his stay there being from 1913 to 1914.

In 1914, and until 1917, he was identified with the Western Drop Forge Co. as chemist and metallurgist. Following, during the World war from 1917 to 1919, Mr. Strauss was commissioned in the United States army, serving the ordnance department in various capacities. In 1919 he was named chief chemist, and later materials engineer for the United States naval gun factory at Washington.

In 1928 Mr. Strauss went with the Vanadium corporation as chief research engineer, a post he has held until his recent election to the vice presidency.

Mr. Strauss' numerous society affiliations include the vice chairmanship of the Pittsburgh chapter of the American Society for Metals; position of chairman of the nonferrous division of the American Foundrymen's association; chairmanship of committee A-10 on iron-chromium and iron-chromium-nickel alloys of the A.S.T.M.; and membership on the iron alloy research committee of the Engineering Foundation.

Mr. Strauss holds a commission of lieutenant commander in the United States naval reserve.

♦ ♦ ♦

John R. Johnson, formerly assistant manager of sales of the Chicago district for Illinois Steel Co., has been appointed district manager of sales in Milwaukee, in the establishment of a new district sales office there by the Carnegie-Illinois Steel Corp., Pittsburgh.

John R. Johnson

Mr. Johnson's business career has been in its entirety with Illinois Steel Co. He is a graduate of the University of Illinois, and was first employed for several years at the Gary, Ind., mills, and later in various sales capacities in the general sales department in Chicago.

Until receiving this new appointment, Mr. Johnson was maintaining offices in Milwaukee as assistant district manager of sales of the Chicago district for Illinois Steel Co.

♦ ♦ ♦

George E. Clifford has been appointed district sales manager of the Republic Steel Corp. in the Los Angeles district, following the resignation of George F. Emanuels, who has been in charge of Republic's Los Angeles office for several years.

George E. Clifford

Mr. Clifford attended the University of Pittsburgh, class of 1918, but left college in 1917 to join the royal flying corps. He received his discharge from the corps in December, 1918. From February, 1919, until 1925, he was connected with the sales department of the Atlas Powder Co., at Pittsburgh. He then became district representative in Cincinnati for the A. M. Byers Co. Two years later he was made manager of the central district, and afterwards was made manager of the Pittsburgh district. He joined the Republic Steel Corp. in August, 1930, as assistant manager of sales in the pipe division of the company.

♦ ♦ ♦

Stewart N. Miller has been appointed representative, with headquarters at 179 Melrose avenue, Needham, Mass., for Automatic Temperature Control Co., Philadelphia.

♦ ♦ ♦

Harry F. Davis has resigned his

position with Edgar T. Ward's Sons Co. to become associated with Dave R. Jones, manufacturers' representative in the Michigan district. They will handle the lines of the Pittsburgh Screw & Bolt Corp., Pittsburgh; Geometric Stamping Co., Cleveland, and the Lakeview Forge & Clevis Co., Erie, Pa. Headquarters are in the General Motors building, Detroit.

George Satterthwaite

Who as noted in STEEL Oct. 28, has been named executive secretary of the Cold-Finished Steel Bar institute, 74 Trinity Place, New York. He formerly was with the American Iron and Steel institute

♦ ♦ ♦

John P. Bankson has been appointed district sales manager of the Pittsburgh district sales office of Harbison-Walker Refractories Co., effective Nov. 1. For the past five years he has been associated with the Cleveland district sales office of the company. Mr. Bankson is a graduate of Yale university, class of 1922.

♦ ♦ ♦

C. L. Welch, Lee S. Abbott, and George E. Fox have been named district managers of Aluminum Industries Inc., Cincinnati, manufacturer of aluminum products.

Mr. Welch will maintain headquarters in Chicago, covering Minnesota, Wisconsin, Michigan, Indiana Illinois and Ohio.

Mr. Abbott will represent it in Kansas, Missouri, Oklahoma, Arkansas, Louisiana, and Texas, maintaining headquarters in Tulsa, Okla.

Mr. Fox will represent the company along the Atlantic seaboard, and his headquarters will be in the New York office.

♦ ♦ ♦

G. A. Webb and A. L. Kershaw have been appointed district representatives of the Despatch Oven Co., Minneapolis, in the Detroit-Toledo territory, with headquarters at 337 Curtis building, Detroit.

♦ ♦ ♦

Dr. W. C. Ashley, formerly with the Eastman Kodak Co., has been appointed to the technical staff of the Battelle Memorial institute, Columbus, O., in the division of applied chemistry. Other appointments include Dr. C. F. Schmarje, formerly research assistant at Iowa State university, in the fuels division; M. L. Samuels, formerly metallurgist at Tennessee Coal, Iron & Railroad Co., and J. G. Lowther, formerly research fellow at the University of Illinois, in the division of physical metallurgy.

♦ ♦ ♦

Dr. William Frederick Durand, professor emeritus of mechanical engineering, Stanford university, California, has been awarded the 32nd annual John Fritz gold medal for 1936, for notable achievement "as authority in hydrodynamic and aerodynamic science, and in its practical application; outstanding leader in research and in engineering education."

J. Ralph Davis

Newly-elected vice president in charge of operations of the Vanadium Corp. of America. He was formerly general manager of the Niagara Falls plant of the Vanadium corporation and will now have charge of operations at Piney River, Va., and Bridgeville, Pa., in addition to those at Niagara Falls

♦ ♦ ♦

W. H. Gibb has resigned as vice president and from an active interest in the Thomson-Gibb Electric Welding Co., Lynn, Mass., and Bay City, Mich., to incorporate the firm of Gibb-Lewis Co., 231 South LaSalle street, Chicago, for the purpose of dealing in patents and patented articles. He will, however, continue on the board of directors of the Thomson-Gibb company.

♦ ♦ ♦

Irving H. Reynolds, manager and chief engineer of the pumping engine department of Allis-Chalmers Mfg. Co., Milwaukee, will retire Dec. 31. He joined the old E. P. Allis Co. in 1884, as assistant to his uncle, the late Edwin Reynolds, general superintendent.

In 1901, upon formation of the Allis-Chalmers Mfg. Co., Mr. Reynolds was made general superintendent of the main works in West Allis, and in the following year, upon the death of his uncle, he was made chief engineer. In 1904, he left to become vice-president and general manager of the William Tod Co., Youngstown, O., returning to Milwaukee in 1912 as manager and chief engineer of the pump department. For the past year he has been active only in an advisory capacity.

♦ ♦ ♦

A. E. Witter has resigned as purchasing agent and assistant treasurer of the Empire Sheet & Tin Plate Co., Mansfield, O., which posts he has held since 1933, when the company was reorganized. Prior to that time he was associated with the Empire Steel Corp., of which the present company is successor.

♦ ♦ ♦

Kenneth D. Mann, formerly sales manager of the southern district for Republic Steel Corp., has been appointed executive vice president of the sales department of the Truscon Steel Co., recently absorbed by Republic, with offices at Youngstown, O.

Robert A. Marble

Who as noted in STEEL for Oct. 21, is now manager of the sales engineering division of Carnegie-Illinois Steel Corp., Pittsburgh. He has been employed by Carnegie Steel Co. continuously for the past 29 years

♦ ♦ ♦

C. Hix Jones has been appointed assistant district manager in the Detroit district for the Youngstown Sheet & Tube Co., Youngstown, O.

Harold M. Pierce, for the past five

(*Please turn to Page* 103)

EDITORIAL

What Price Stability If Unit Wages Still Climb?

THE thirty-sixth National Automobile show in New York was the occasion for an unusual number of articles, interviews and addresses by the ranking executives of American industry and finance. Almost without exception, these eminent spokesmen, in appraising the significance of the show, stressed its beneficial effects upon employment.

They endorsed wholeheartedly the effort of the motor car builders to provide steadier jobs for their employes by leveling off the seasonal peaks and valleys of production.

It is gratifying to know that at last powerful influences are at work to achieve this worthy objective. Nevertheless, it is pertinent to ask whether or not stability is possible under the economic fallacies which now enjoy favor in high places. Will it not be necessary to change the trend of wage and hour movements before sound, sustained stability can be realized?

In order to comprehend the significance of this question, consider the present tendency in unit wages. In a radio address delivered during the automobile show, the head of a large motor car company declared with pride that wages being paid to its employes are higher today than they were in 1929. His statement can be applied to a wide sector of industry. The National Industrial Conference board recently reported that its monthly survey of 25 manufacturing industries showed that hourly earnings in August, 1935, averaged 60.1 cents per hour, or 2 per cent above the average of 58.9 cents for all of 1929.

Emphasis Should Be Shifted from High Unit Wages to Annual Income Received in Wages

Many authorities will agree that a constantly rising tendency in unit wages is not compatible with stability in employment under present conditions. However, it would be possible and certainly is desirable that the *annual* income of employes be increased. The latter alternative would prove to be advantageous to employe, employer and the public interest, and at the same time would lend itself more readily to the requirements of stabilized industrial operations.

However, what chance can be vouchsafed to the idea of higher annual income against that of high unit wages under existing tendencies?

Almost every movement on the political horizon today is in opposition to the idea of higher annual income for wage earners. The Black-Connery short week bills, which are certain to bob up again in the next congress, if passed would increase hourly rates sharply and seriously delay the advent of an increase in real income. General Hugh Johnson, who ought to know better, is contending in his syndicated column that the 30-hour week is the answer to the unemployment problem. The powerful A. F. of L., while occasionally endorsing the idea of a higher annual income for labor, consistently defeats that purpose by fighting incessantly for higher unit wages. Even the President, who on several occasions has touched upon the merit of an increased yearly income, has weakened his position on this point by capitulating to the union labor bloc on the issue of monthly pay for relief workers.

Time for Removing Some of Artificial Props Of Acute Depression Period Is Near

This and other evidence shows all too clearly that official Washington and some other elements of the public are blind to the current demands of the employment problem. In 1933 when there were few jobs, the idea of "spreading the work" and of artificially pegging wages had some merit as a temporary expedient. Today, with industrial activity expanding, the conditions have changed. The time is near at hand when some of the arbitrary props of the acute depression period should be removed.

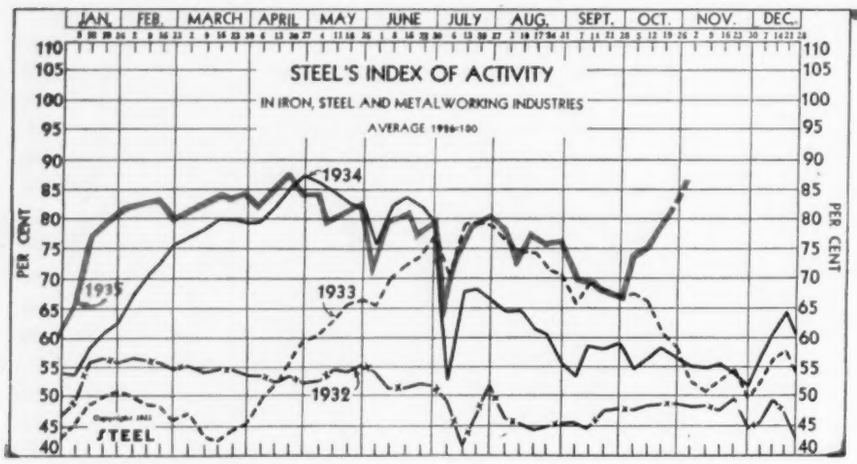
Industrialists can perform a useful service by pointing out the true significance of hourly wages which now exceed those of 1929. Such exorbitant rates are made up of two ingredients —(1) A fair wage for the service rendered by the employe, and (2) a bonus which industry granted as a depression expedient to help offset the effect of fewer hours per year upon the employe's annual income.

In other words, while few people realize it, employes are paid a bonus for working fewer hours per year, in exactly the same way that farmers are paid a bonus for not raising hogs.

Everybody knows that such policies cannot be continued long without extremely harmful results. Gradually the wage bonus must be exchanged for hours of work.

The stability which automobile builders and other industrialists are seeking is a highly desirable objective. If their efforts are to be crowned with success, they must first slow, then halt and finally reverse the current trend in unit wage rates.

THE BUSINESS TREND



STEEL's *index of activity in the iron, steel and metalworking industries increased 4.1 points to 86.5 in the week ending Nov. 2:*

Week ending	1935	1934	1933	1932
Aug. 24	77.0	60.3	71.6	45.2
Aug. 31.	77.3	55.1	70.3	45.4
Sept. 7	70.9	53.5	65.5	44.9
Sept. 14	70.1	58.7	69.1	47.3
Sept. 21	69.4	58.1	68.2	48.0
Sept. 28	68.5	59.3	66.9	47.7
Oct. 5	73.3	54.7	67.4	48.4
Oct. 12	74.9	56.4	66.0	48.7
Oct. 10	77.4	58.2	60.9	58.7
Oct. 26	82.4†	56.3	58.0	48.3
Nov. 2	86.5*	55.0	52.3	48.5

†Revised. *Preliminary.

The index charted above is based upon freight car loadings, electric power output, automobile assemblies (estimated by Cram's Reports) and the steelworks operating rate (estimated by STEEL.) *Average for 1926 equals 100, weighted as follows: Steel rate 40, and car loadings, power output and auto assemblies each 20.*

Industrial Activity Is at New High Point for 1935

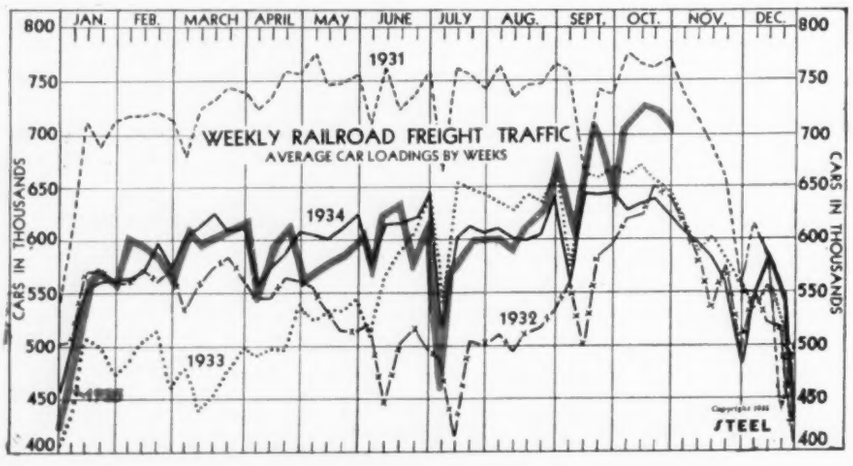
FAVORABLE factors affecting industrial activity in the metalworking industries have combined to force STEEL's index up to the highest point touched thus far in 1935. For the week ending Nov. 2, the index stood at 86.5, which represents a sharp rise from 82.4 in the preceding week. The highest point previously reported this year was 86.3 in the third week of April, which marked the crest of the spring upturn.

The rising tide of business volume is reflected most noticeably in the figures for automobile assemblies, steelworks operations and electric power output. Revenue freight car loadings have been tapering off from the high weeks in mid-October, and for the week ending Nov. 2 dropped below the 700,000 mark for the first time in a month.

From the present outlook, motor car output and steelworks operations may be expected to move upward steadily for a number of weeks. The steel rate now is practically on a par with the highest point touched in the first quarter of the year. The rise from the low point of July to date has been somewhat more rapid than the decline from mid-February to the July low. Automobile output should continue upward until dealers' stocks have been filled, at which time a slight easing off in production may occur temporarily. The present extension of higher prices from pig iron to certain semifinished steel products may induce a more active market in finished rolled steel.

Electric power output again has registered a new all-time high. The figure for the week ending Nov. 2 was 1,897,180,000 kilowatt-hours, which suggests that the 1,900,000,000 line probably will be crossed at an early date.

1935	
Oct. 26	707,826
Oct. 18	732,947
Oct. 12	734,274
Oct. 5	706,877
Sept. 28	630,771
Sept. 21	707,644
Sept. 14	700,356
Sept. 7	592,786
Aug. 31	679,861
Aug. 24	626,373
Aug. 17	615,006
Aug. 10	583,743
Aug. 3	597,083

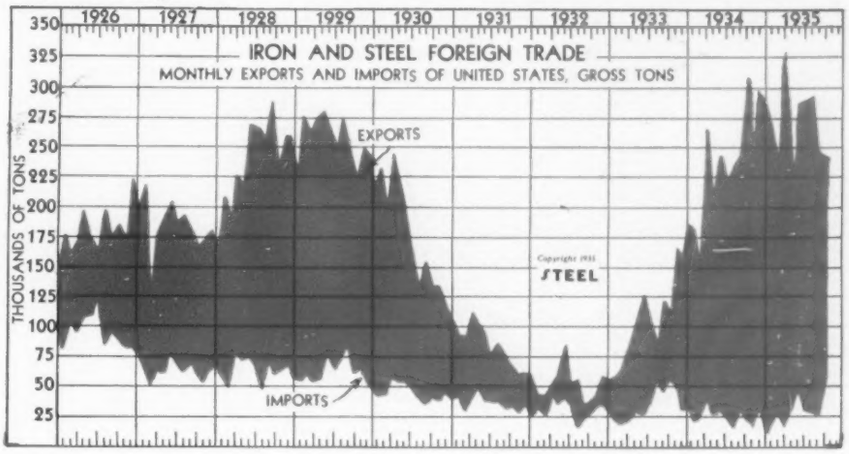


1934	
Oct. 27	624,868
Oct. 20	640,727
Oct. 13	636,999
Oct. 6	632,406
Sept. 29	646,084
Sept. 22	644,498
Sept. 15	647,485
Sept. 8	563,883
Sept. 1	563,883
Aug. 25	606,917
Aug. 18	601,788
Aug. 11	603,968
Aug. 4	612,660

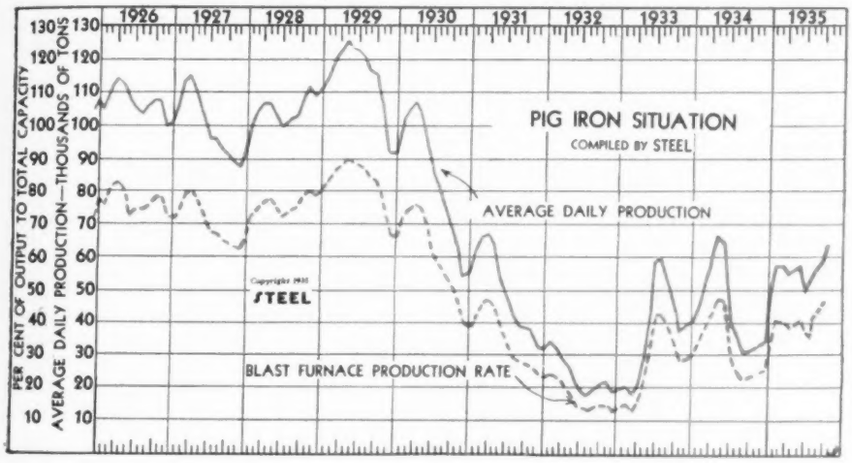
September Steel Imports Up; Exports Decline

Gross Tons

	1935 Imports	1935 Exports	1934 Imports	1934 Exports
Jan.	22,784	262,740	22,653	178,023
Feb.	28,905	228,537	25,407	151,184
Mar.	21,409	323,035	38,393	261,260
April	28,866	205,336	26,862	201,539
May	47,719	286,598	29,465	241,753
June	33,208	289,687	24,848	219,406
July	31,894	296,802	17,676	233,186
Aug.	31,312	247,312	32,418	242,947
Sept.	53,158	244,419	23,847	301,330
Oct.	.....	.....	20,202	220,209
Nov.	.....	.....	35,272	299,263
Dec.	.....	.....	19,708	282,655
Total	.....	.....	316,761	2,832,764



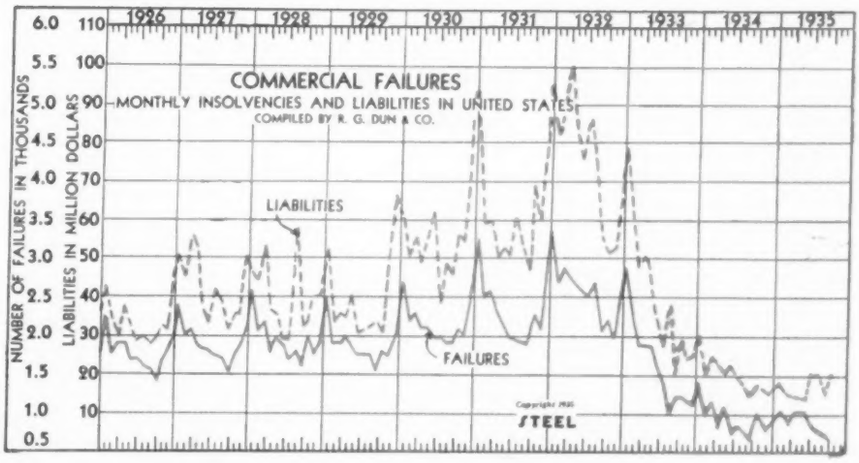
Daily Iron Output Continues Upward Trend

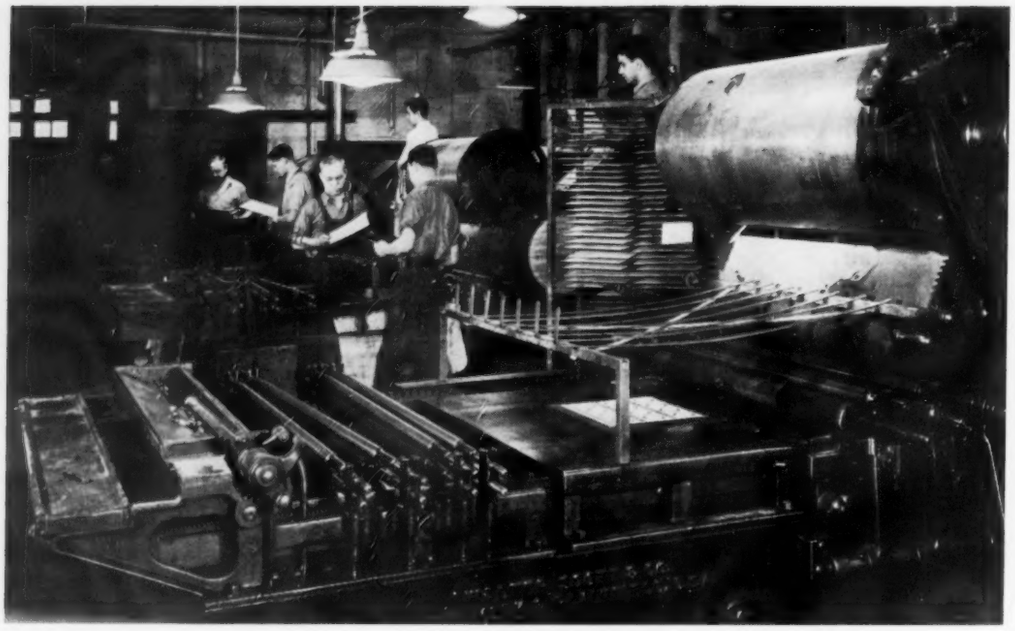


	Daily Average 1935	Daily Average 1934	Blast Furnace Rate 1935	Blast Furnace Rate 1934
Jan.	47,692	39,537	34.2	28.3
Feb.	57,675	45,385	41.4	32.5
Mar.	57,120	52,438	41.0	37.5
April	55,719	57,873	40.0	41.4
May	55,986	66,370	40.2	47.5
June	51,949	64,563	37.2	46.3
July	49,043	39,630	35.2	28.4
Aug.	56,767	34,199	40.7	24.5
Sept.	59,009	29,969	42.5	21.5
Oct.	63,818	30,689	45.8	22.1
Nov.	.....	31,930	.....	22.8
Dec.	.....	33,161	.....	23.7

Commercial Failures Drop; Liabilities Up Moderately

	Failures 1935	Failures 1934	Liabilities 1935	Liabilities 1934
Jan.	1,184	1,364	$18,823,697	$32,905,428
Feb.	1,005	1,049	18,737,657	19,444,718
Mar.	976	1,102	18,522,840	25,786,975
Apr.	1,115	1,052	18,063,923	25,786,975
May	1,027	977	15,669,627	22,560,835
June	961	1,033	20,463,097	23,868,293
Juy	931	912	20,446,761	19,325,517
Aug.	910	929	17,845,596	18,459,903
Sept.	806	790	21,837,926	16,440,147
Oct.	.....	1,091	.....	19,968,448
Nov.	.....	923	.....	18,349,791
Dec.	.....	963	.....	19,910,610





OFFSET press which transfers the design from the zinc printing plate onto the metal which is later to be etched. Printed metal blanks are stacked in the portable rack shown in the center background

Beauty and Permanence of Finish

APPLICATIONS for metal nameplates, insignia, trademarks and other identifying tags are limitless, and production runs well into the millions every year. Machinery, automobiles, refrigerators, radios, instrument panels, farm equipment, switches, meters, clocks, electrical appliances, stoves, containers and elevators are illustrative of the wide range in size and type of equipment on which nameplates are used.

Several metals, as well as several manufacturing methods, are employed in producing nameplates. Brass, zinc, Monel metal, aluminum, steel, stainless steel, tinplate, nickel zinc, nickel silver, chrome zinc and bronze are metals used regularly, with etching, coin embossing, electroplating, enameling and lithographing among the methods used to obtain various types of finishes.

Etching is widely used in this field and, in addition to application for nameplates, it is employed extensively in the finishing of decorative metal panels for instrument boards, soda fountains, elevator doors and other interior paneling. Crowe Name Plate & Mfg. Co., Chicago, is one of the leaders in this field, and is equipped to turn out many unusual types of etched metal pieces including clock and instrument dials, as well as other forms of so-called "printed" metal.

The etching industry on a commercial basis dates from about 1904 and many developments and much progress have marked the past 10 years particularly. Basic principles continue to be followed, but with the aid of electroplating and the application of colors, combination finishes are possible that are not only beautiful from an artistic viewpoint but practical as well.

Finish Before Fabricating

In the etching process, the raw material in sheets cut to process size is first prepared with that particular finish which later will be the highlights of the etched plate. For example, a plate having buffed nickel letters requires buffing and nickel plating the metal in sheets as the first step. Chrome plated letters or highlights, silver plated, black oxidized finish or any other finish (with a few exceptions) must be prepared before printing or etching.

This is one of the peculiarities of the etching industry, in that the finish of the article is applied before fabrication, requiring utmost care in the handling of the work as it progresses through the various steps. Thus, difficulties are imposed which are not usually encountered in other processes where the buffing, plating or oxidizing is applied to the finished article.

With the stock now absolutely grease-free and without tarnish, ready for printing, it will be well to turn back to the original design intended for the metal and observe how it is transferred ultimately to the metal.

A staff of artists is maintained to handle nameplate designs and prepare them for printing, or to work with the customer to evolve an attractive and practical design. The layout of the plate is prepared in large size on scratchboard with India ink, working from original blueprints or tracings. This inked layout is then photographed and the negative carefully retouched. Where lettering or printing is involved in the design, one of three systems is used. The lettering may be set up in type and proofs made on a press; the lettering may be done by hand; or a photolettering machine may be

BY A. H. ALLEN
Associate Editor, STEEL

METAL blanks, with the portions not to be etched protected by a baked coating of resist powder, are lowered on racks into the etching solutions, air agitated. Depth of etching varies from 0.001 to 0.003-inch

Combined by Etching Process

used, which operates similarly to a typewriter or linotype machine, except that when a key is depressed the letter or figure is reproduced by means of lights and sensitized paper.

When the negative is adjudged satisfactory, it is placed in another machine which transfers the design to a sensitized master zinc plate. When this zinc plate has been exposed and developed, it is placed in the lithographing or offset press. Exposed portions will take ink, while the unexposed portions will not take ink because of a thin film of water which adheres to them. Thus the design in ink is transferred to a rubber covered cylinder which in turn imprints it on the prepared metal nameplate. This is a standard photolithographing process.

After the design or lettering is lithographed to the surface of the metal sheet, the latter is dusted with suitable resist powder over the entire surface. The background is brushed free from powder, which clings only to the wet ink. Baking to correct temperature on a conveyor belt which travels through a furnace melts this powder to a solid film, unaffected by acid or plating solutions. Thus the original finish of the metal is protected and later will become the highlights of the design.

The reverse side of the sheet also is given a protective coating and the plate is then ready for etching. This is done by submerging racks of the sheets in an air agitated solution. Different metals require different etching solutions. Nitric acid is used for plain steel; iron chloride solution for stainless steel, brass and bronze; hydrofluoric and hydrochloric acids for aluminum; sodium bichromate and sulphuric acid for zinc, etc. A considerable amount of research and experiment is involved in preparation of suitable etching solutions, and details of exact analyses are rather closely guarded. Depth of etching varies from 0.001 to 0.003-inch, depending upon the design and finish. After the sheets are removed from the etching solution, they are washed, and dried by rubbing with sawdust.

Protective Coating Removed

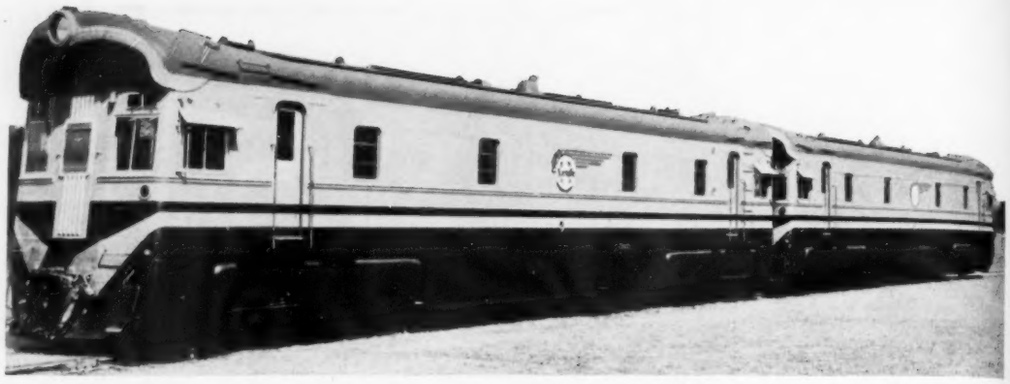
The background is then ready for oxidizing, silver, copper or chrome plating, colored enamels or combinations of the various finishes which produce the desired contrast with the highlights which are still covered with the film of resist. This may be removed at any time by washing with naphtha or benzine.

Black background on brass is produced by oxidizing the exposed surfaces in an ammonia-copper carbonate solution; black on aluminum is black nickel plated directly to the metal; zinc is blackened in a sodium sulphocyanate solution. If a color is required it usually is applied before removing the resist and must be such that it is insoluble in naphtha or benzine, and in many cases today must withstand plating solutions.

When the correct finish has been applied to the background, the resist is removed and the sheets are cleaned, inspected and lacquered. The lacquer in most cases must be of a special nature.

The sheet, with its specially prepared finish, is now ready for any necessary machining operations, such as blanking, forming, perforating or numbering. It is evident that a finish of considerable strength is required to withstand these subsequent operations. In addition, most finishes must stand up under weather conditions, violet ray tests, salt spray and abrasion tests.

An example of the steps required in a typical etched part is an automotive instrument panel, finished in Butler chromium highlights and oxidized silver background. The chrome plating is done on the metal sheet before the resist is applied. The exposed background is stripped of chromium plate and etched, satinned and silver plated. The resist coating



FOUR etched and colored stainless steel insignia serve to identify prominently this new Santa Fe streamlined train, the Super Chief. The emblems are 96 inches in length and include the familiar maltese cross in a circle, combined with the head and streaming head-dress of an Indian chief, long used by the road in its advertising

then is removed and the sheets are put through dies for blanking and perforating. Lugs are soldered on the back, followed by oxidizing the silver, final rubbing down and lacquering. Careful handling is absolutely necessary, for the slightest scratch scraps the entire plate and it cannot be refinished.

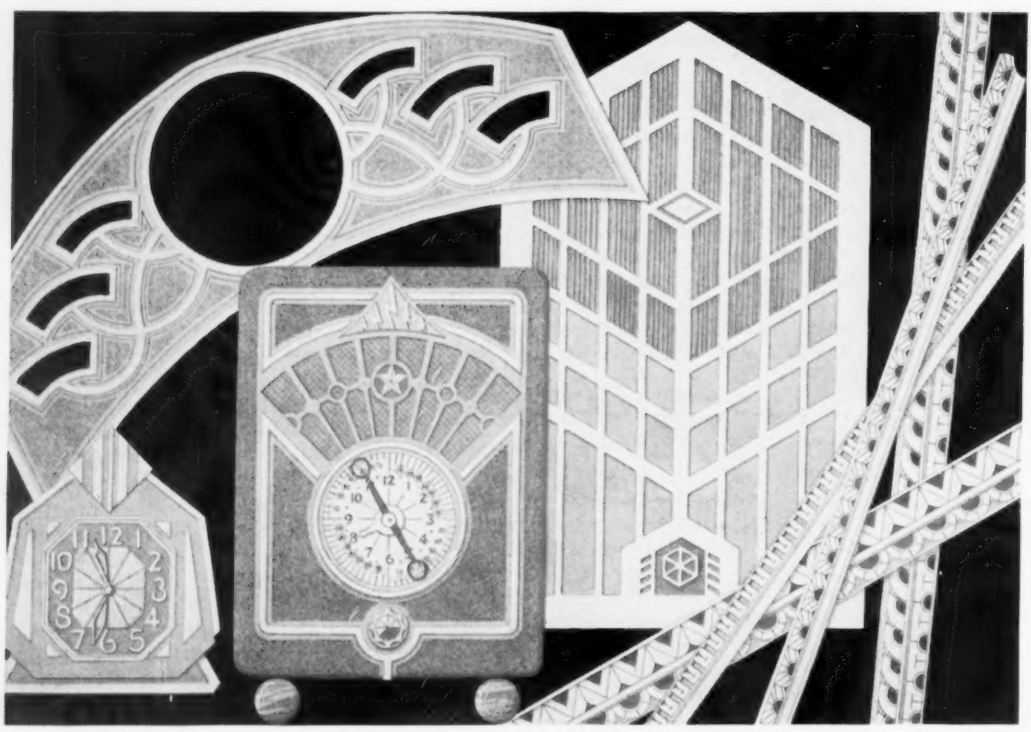
One of the newest metals in the etching field is stainless steel of the 18-8 chrome-nickel type. A wide range of striking effects is possible with this metal, such as partial bronze plating, black backgrounds, various types of buffing and polishing. High cost of the material restricts its wide adoption, but it has numerous ideal applications. As one rather unusual example, the case is cited of nameplates for an agricultural implement. These had been made in various metals, most of which corroded in a short time. Change was made to stainless steel, and the plates apparently will last indefinitely. Another etched stainless steel job was the four 96-inch colored insignia attached to the sides of the new streamlined train, the Santa Fe Super Chief.

Not a Simple Process

Although the etching of metal may appear fairly routine from this description, in reality it is a complicated process, involving careful coordination of equipment and training of operators. It is not a process which any manufacturer could install overnight by simply using a tank of etching solution and a few racks to hold the parts. The different metals and finishes, together with new applications and requirements, present problems which require experience and constant progress in development work to meet the demands.

While etched nameplates have striking beauty and high permanence, it is possible to obtain pleasing effects with coin embossed nameplates at somewhat less cost. These are popularly finished in two-tone chrome plate, with buffed highlights contrasting a satin background, but are also available in harmonizing bronze or brass finishes. Inlaid lacquer enamel colors enhance appearance on some plates. Dies for these plates are cut in special tool steel by master die engravers using modern die cutting and duplicating machines. The nameplates are struck or heavy drop or pneumatic hammers, or with hydraulic press equipment, ample pressure being exerted to bring out in relief all details of the design. Nameplates of more than ordinary height (relief) are struck two or more blows, with annealing between the operations.

On another nonetched finish, zinc is used, with the design and lettering produced by black nickel plating. Color may be added by lithography. This is a surface finished nameplate, without relief or the durability of an etching, yet is sufficient for some uses. A fourth type is offset lithographed nameplates, on metal which



APPEARANCE and style are emphasized in these typical examples of etched metal parts, including panels, dials, scuff plates, grilles and other parts

has been specially primed for adhesion. Additional serviceability is provided by a coating of clear lacquer and a thorough baking. Aluminum and zinc, when acid bleached to a silvery metallic sheen, afford attractive background, and nameplates lithographed on these metals are used extensively in a wide range of applications.

A comparatively new finish is the alumilite or anodic process, which is an electrolytic method for applying a protective and decorative coating to aluminum. Anodizing produces a surface hardness that shows unusual resistance to scratching, wear and corrosion. The coating itself becomes an integral part of the aluminum, eliminating possibility of chipping or peeling. The plain treatment produces a silver white coating, but a variety of lustrous colors is available.

Publishes Manual on Use Of Steel in Fixed Dams

To present useful engineering data regarding the design and maintenance of fixed steel dams, the American Institute of Steel Construction announces issuance of a manual on this subject for the use of engineers and builders of dams. The manual represents the results of many years of experience, not only in the construction of lock gates and movable dams in steel, but likewise the construction of steel facing for fill dams and dams built completely of steel.

The material for this work has been collected during the past few years by the various agencies of the institute. It has been assembled and put into manual form, together with comprehensive design data, by Dr. Otis E. Hovey, consulting engineer, New York, formerly with the American Bridge Co.

Advantages Overlooked

"The use of steel as a suitable and economical material for the construction of fixed dams," says Dr. Hovey, "has received little attention. It has been used freely and satisfactorily for movable dams of all types for many years, but for almost 30 years it has been almost ignored in connection with fixed dams. Long ago a few fixed steel dams were built which now are in excellent condition.

"At a time of intensive study and research into the best and most economical use of the various materials for construction, it is hoped that the advantages of steel in the construction of fixed dams will not be overlooked by engineers."

Offering a practical guide for the design, construction and maintenance of steel dams, the manual gives a general discussion of the theory and design of steel dams, descriptions of steel dams, fill dams with steel core plates, fill dams with steel face plates, dams with steel sheet piling cut-offs, and a complete bibliography of the subject.

Qualified engineers may obtain copies of the manual by addressing the American Institute of Steel Construction, with headquarters at 200 Madison avenue, New York.

Prepares Two Booklets on Zinc Alloy Die Castings

Two attractive booklets dealing with zinc alloy die casting have been prepared by the New Jersey Zinc Co., New York. One booklet, titled "A Visual Report of Progress," is an 80-page photographic review of die casting progress. It contains more than 150 illustrations of die cast prdoucts, each illustration being accompanied by an explanatory caption. Products are arranged in sections under the heads of automobiles, machine parts, small tools, office and store equipment, household appliances, clocks and novelties, locks and hardware, toys, and miscellaneous. A table of properties of four zinc die casting alloys concludes the publication.

The second booklet is titled "Zamak Alloys for Zinc Alloy Die Castings," and contains the story of the development of these alloys in a technical manner. This is the first publication issued on this subject in several years. The 42 pages are divided into six chapters dealing with chemical compositions, physical and mechanical properties, aging changes, corrosion resistance, finishing of castings, and machining and assembling of castings. Numerous miscellaneous properties of the alloys are recorded in a six-page appendix.

Copies of these booklets may be obtained upon request to the New Jersey Zinc Co., 160 Front street, New York.

Bakelite Corp. Celebrates Its Silver Anniversary

In commemoration of its twenty-fifth anniversary, celebrated on Oct. 10, the Bakelite Corp., New York, has issued a special 40-page edition of its house magazine, *Bakelite Review*. This issue traces the history not only of the corporation, but of the plastic industry in the past 25 years and gives some idea of the industry's future.

Copies of this silver anniversary number may be obtained by addressing the Bakelite Corp. at 247 Park avenue, New York.

Rolling Screen Doors

WITHOUT sacrifice of air, light or vision, these rolling grilles, of steel, provide reliable safeguards against trespassing. The grille is of round steel bars connected by ornamental links of pressed steel. Apertures are small enough to exclude hands or missiles. The grille coils on a heavy barrel above the lintel and is locked in and travels in guides mounted on the sides of the opening. Helical springs enclosed in the barrel provide counterbalance. Built by the Kinnear Mfg. Co., Columbus, O., the grilles may be installed either on the face of a wall or in reveals provided in the construction of the building. They may be arranged to be operated manually, mechanically by means of crank or chain, or electrically

Molded Plastic Mill Bearings Effect Large Power Savings

BY HARLAN F. HORNE
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

MOLDED-PLASTIC bearings offer certain advantages over metal bearings, so that their adoption in many steel mills for all types of both difficult and easy rolling jobs is increasing. Operating economies and the elimination of difficulties formerly encountered with some metal-type bearings are evident in certain cases that few rolling mill superintendents are overlooking the possibilities which these relatively new bearings offer.

Micarta bearings are manufactured by molding under extremely high pressure and heat, layers of fabric which have been impregnated with a special hardening resinoid. Under the action of the heat and pressure the product becomes a dense infusible structure, the fabric imparting the necessary continuity of fiber structure and the resin acting as the bonding medium.

Natural Lubricants Not Used

During the development stages of this bearing, graphite and other so-called natural lubricating agents were added to the bearing. However, under normal operating conditions such additions were in no sense beneficial to the bearing and in many cases, actually decreased their service ability. Prior to development by the Westinghouse company of the process for hardening the resinoid, heavy fabric belting represented the ultimate in laminated bearing structure.

However, with bearings manufactured on the new principle, results heretofore considered excellent have been surpassed. Extremely difficult applications, heretofore considered impractical, have been worked out successfully. It has been found most satisfactory to manufacture the radial portion of the bearing independently from the thrust portion. This

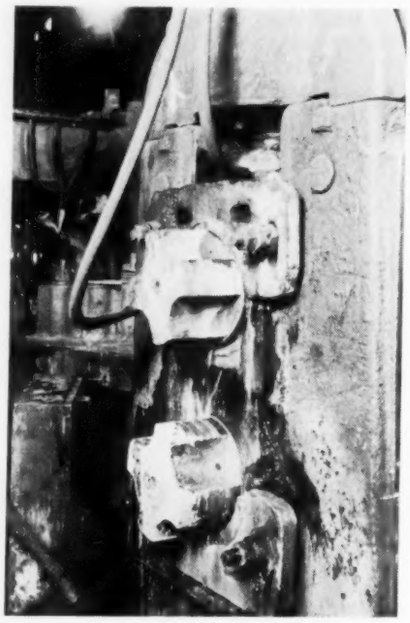


Fig. 2—One stand of a 11½-inch tandem billet mill showing bearing in use

enables either component when worn to be replaced without disturbing the other. Suggested methods of application are shown in Fig. 1. Any one of these generally can be used to apply a laminated bearing to existing chucks without an undue amount of machining.

Proven advantages, which hundreds of installations of Micarta bearings have shown in all types of rolling, are as follows:

1. A power saving ranging from 20 to 40 per cent.
2. More efficient operation of the mill due to less frequent screw-downs and, hence, fewer test pieces and less material scrapped because of improper gage.
3. Elimination of the cost and trouble of oil or grease lubrication.
4. Bearings themselves show a remarkable increase in life over the conventional metal type. Roll maintenance also is reduced.

Wood bearings have some of these advantages to a partial degree, but because of low compressive strength, their use is limited to light duty mills. Wood bearings also vary from lot to lot, which is frequently the case with a natural product, and even at their best, molded-plastic bearings outlast them several times.

Lignum-vitae bearings are apt to absorb a large quantity of water during use and later dry out and crack or shrink, causing seizing of the roll neck. Molded plastic bearings can be stocked for a length of time without appreciable change in physical properties or dimension.

Foresee Use in Hot Mills

Phenolic resin bearings eventually should find wide use on all hot-mill rolling except in finishing hot sheets. In the latter case the water would chill the rolls and restrict holding the sheet to gage. Already a number of mills are using this type of bearing for the former type of work, while others are experimenting with cold mills and expanding the use of phenolic resin units following tests.

In some cases it has been necessary to modify the design of the bearing from the standard used in hot rolling. For example, in rolling cold strip the bearing is cut longitudinally into three pieces (Fig. 4), the pieces being held in place by the keeper plate. This type of design is recommended because high pressure on the bearing would tend to fracture it longitudinally. Recently, Westinghouse engineers designed such a bearing for use on a cold strip mill where the pressures are more than 6000 pounds per square inch and the speeds low. The peripheral

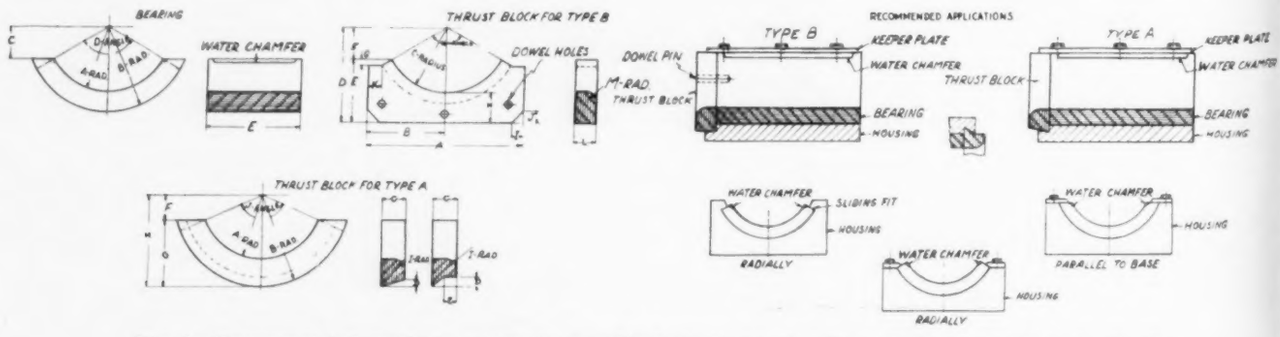


Fig. 1—Recommended methods of adapting molded plastic bearing liners and thrust blocks to chuck

neck speed in this case is around 80 feet per minute. As shown in Fig. 4, three segments were employed.

With a properly aligned laminated bearing, the problem of overheating or smoking is a conclusive indication of either insufficient or incorrect application of water.

Various types of steel rolling mills where Micarta bearings have been employed successfully include:

ROD MILLS: This represents a fairly easy application and a number of mills throughout the country are equipped completely. Several others are also partially equipped including three or four roughing stands in addition to the finishing stands. The average tonnage approximates 70,000 tons per bearing, compared with 3000 tons formerly obtained on metal. On the highest speed stands Micarta bearings frequently have rolled over 200,000 tons versus 2000 tons on metal bearings. These figures were obtained on one of our earlier type bearings and since that time other improvements have been made. As a matter of fact, recent installations on new bearing materials cannot be judged accurately for ultimate life in a period of less than a year. Power savings on this type of installation averages over 30 per cent and gage is materially better because of much slower rate of wear on the bearings.

Bearings Show Long Life

MERCHANT MILLS: These installations are confined to the finishing and leader passes and here phenolic resin bearings have shown the same durability and power saving. Thrust is a considerable problem in a mill of this type and the two piece construction claims a decided advantage. In general, 20 times the life of a metal bearing is obtained on applications of this kind.

STRIP MILLS: A number of continuous hot narrow strip and band mills in actual performance are outwearing an average of ten metal bearings. Still greater life advantages could be shown except that it is necessary to use a thin radial lining averaging ½-inch. This is to insure the bearing against flexing on the high pressures encountered as the modulus of compression on the laminated material is lower than on metal. Power savings of 30 per cent or better consistently are obtained on this type mill with molded plastic bearings.

SKELP MILLS: About five continuous skelp mills are equipped with an average of five stands each with phenolic resin bearings. One mill is obtaining approximately 70,000 tons of rolled metal per bearing on the latest laminated type as compared with 10,000 tons formerly considered good for a laminated product. A figure of 900 tons formerly obtained on metallic bearings was considered good operation which also consumed about 35 per cent more power than the latest type Micarta bearing.

BAR AND BILLET MILLS: Molded plastic bearings have been successful on bar mills, both sheet bar and those rolling rounds and squares. Power savings of about 35 per cent have been shown and a durability of ten times that obtained with metal bearings. In addition, rejections for off-gage steel have been cut materially since adoption. This saving alone, more than justifies the cost of installation and at least 200,000 tons is the indicated life in this duty with the latest bearing.

BLOOMING MILLS AND HOT SHEET MILLS: Installations of phenolic resin bearings have been made in mills of both types but only recently so that service records are not complete. From all indications, however, laminated bearings are entirely practical for such duty and show the same general advantages of power saving and life as in other mills.

Gage Is Held Accurately

BRASS MILLS: A number of large installations have been made with entire success in every case. Gage on the brass strip is held much more accurately with less frequent adjustments and in addition, the power saving is an appreciable item. Several of the largest brass manufacturers have equipped their mills completely with bearings of the fabric type.

With such pronounced advantages and so many service records, it is not surprising that adoption of phenolic resin bearings is proceeding on all types of mills at a rapid rate. It is a frequent occurrence for a mill superintendent to install one or two sets of bearings and find them so satisfactory that he immediately expands their use into other stands. Phenolic resin bearings have definitely passed the experimental stage. Even taking into consideration the initial cost of chuck changes, their economies are proved.

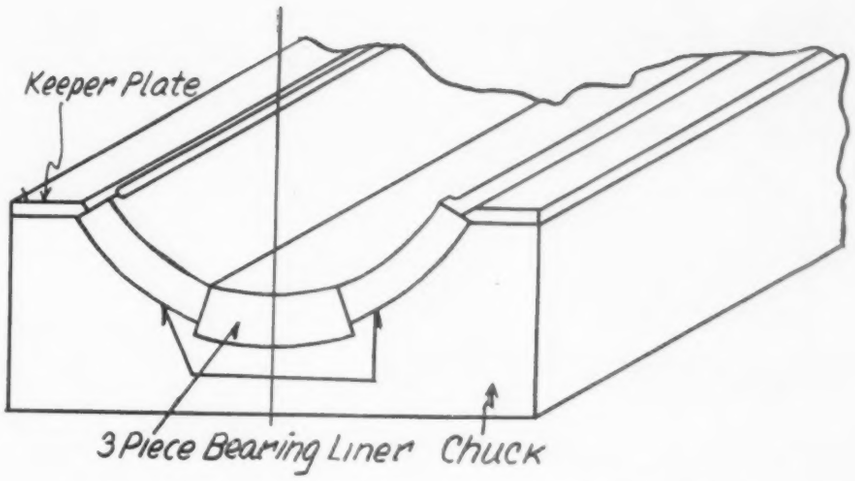


Fig. 4—Bearing for cold strip mill or for high-pressure job

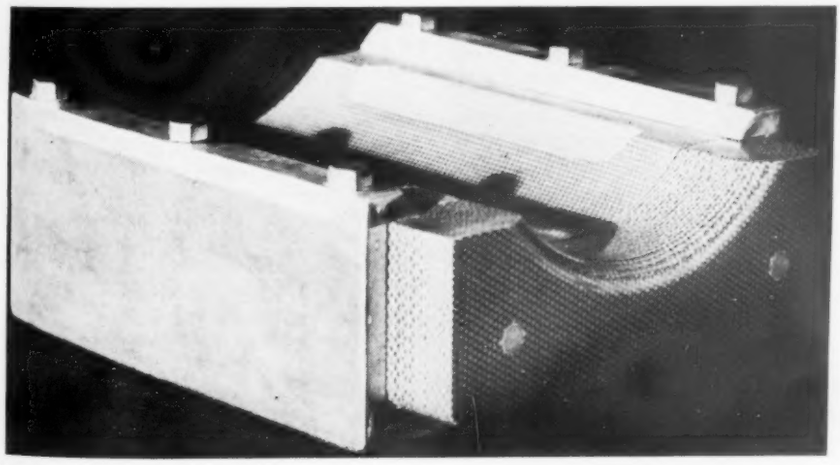


Fig. 3—View of Micarta roll neck bearing in chuck

Flexible Ice Cube Tray

McCord Radiator & Mfg. Co., Detroit, has developed a new ice cube tray known as Metiflex. It consists of a single sheet of stainless steel formed into a row of cube shaped compartments. Instead of using water to loosen the ice cubes, the tray is simply flexed.

METHODS AND MATERIALS

Welded Base for Drilling Machine Is Rigid but Light

An interesting welded steel structure recently has been developed by Lukenweld Inc., Coatesville, Pa. Shown in the accompanying illustration, it is the main base for an automatic, indexing, drilling machine built by Kingsbury Machine Tool Corp., Keene, N. H., for handling various drilling operations on a rear main bearing cap.

The welded base is 67 inches in diameter and 36 inches in overall height, including the 9-inch center pedestal. Altogether 18 pieces of flame-cut and formed steel plates were used. The internal stiffeners were of ½-inch, the main shell of ¾-inch and the top and bottom flanges of ⅞-inch plates. The steel was of a special welding analysis developed by Lukens Steel Co., Coatesville, and covered electrodes were employed under insurance welding control. The finished welded structure was thoroughly stress-relieved in a furnace prior to shipment.

To preserve drill alignments and eliminate possibility of chatter in the machine, it was necessary to provide a base of substantial and rigid construction. However, it was essential to keep weight at minimum. The welded unit weighed only 2420 pounds in the rough and about 2100 pounds after machining.

\$ \$ \$

Aluminum Skin Protects Sheets of Aluminum Alloy

Although definite data on the ultimate useful life of high-strength aluminum alloy sheets coated with pure aluminum are not yet available, it is evident that this combination is thoroughly dependable from the standpoint of corrosion resistance under all ordinary weather conditions, according to the national bureau of standards, Washington.

The commercial development of sheet material for building aircraft, consisting of a high-strength alloy sheet, bearing a protective surface skin of pure aluminum, has turned out to be one of the notable advances of the past decade in the aircraft materials field, it is pointed out.

Following its first large-scale utilization, systematic periodic examinations have been made at the bureau of standards to determine the degree of reliability of this material under service conditions. The results of the latest examination, completed a short time ago, confirm the early predictions based on laboratory experiments.

It is interesting to note that although the aluminum protective skin is not immune to corrosion, this very corrosion accomplishes a useful purpose. The protection afforded galvanized steel by the "sacrificial" corrosion of its zinc surface finds its counterpart in the manner in which the aluminum protects the underlying alloy.

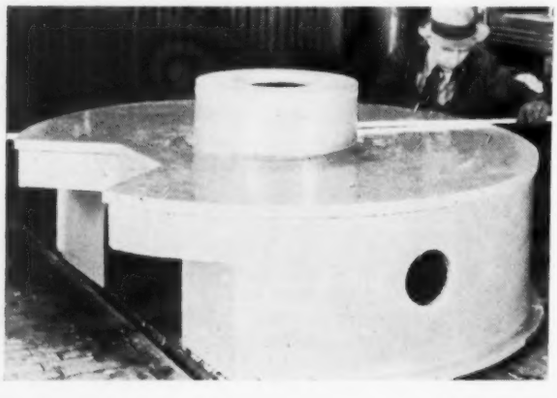
It has been observed that even when, in certain spots, corrosion has entirely penetrated the aluminum coating, perforation of the sheet has not occurred. Moreover, the electrolytic behavior of the aluminum coating is favorable to a lateral spreading of the corrosive attack, rather than to deep penetration which results in perforation, according to the bureau.

\$ \$ \$

Valve Heating Controlled By Photoelectric Cell

An interesting recent application of the photoelectric cell is for controlling the electric resistance heating of the tips of automotive valve stems in the hardening operation. The operator places the valve stem between the electrically driven dies and when the dies have located the work, the current is turned on. As the valve stem comes up to correct temperature or color, the photoelectric cell turns off the heating current, and then by means of a reliable electronic time delay, the dies are opened 0.05 second later and the piece is quenched. The delay in opening the dies after the heating current is turned off eliminates the possibility of burning.

Similar installations of this type now are being made for heating small



Welded base for automatic, indexing drilling machine, is 67 inches in diameter and 36 inches high including the 9-inch center pedestal; it was welded of 18 pieces of steel which were flame-cut and formed. The base weighs 2420 pounds in the rough and 2100 pounds after machining

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Devises New Methods for Handling Acids Safely

Danger always attends the handling of 10-gallon carboys of hydrochloric, nitric and sulphuric acid. In the Westinghouse Lamp Co., Bloomfield, N. J., only one serious injury has resulted from acid burns, but the potential danger is great enough to warrant rigid safety measures. A new method of ejecting small quantities of acid from carboys has been adopted and is expected to minimize the risk in this work.

Acid formerly was ejected by applying air pressure of a few pounds to the carboy, forcing a flow of acid into filter flasks. The likelihood of breaking the carboy seemed remote, but one eventually did break with serious consequences to the worker. Further danger also was involved when tilting a full carboy to empty it into an acid vat at one operation. Splashing acid always presents a hazard.

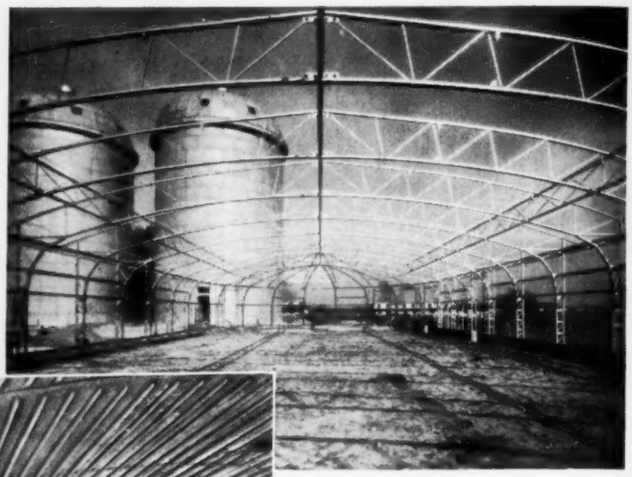
Now a simple suction device is employed to draw small quantities of acid from a carboy for use in processing lamp filaments. A filter flask is plugged with a rubber cork and two glass tubes. One tube drops down into the carboy; the other is connected to a rubber suction hose. Air is withdrawn from the flask, creating a suction which draws acid up from the carboy.

An interesting feature of this ejector device is the method of creating the suction. The rubber hose is attached to the suction side of a laboratory water filter. As air is released from the pressure line through the nozzle of the water filter, it creates a suction in the hose, which, though slight, is sufficient to

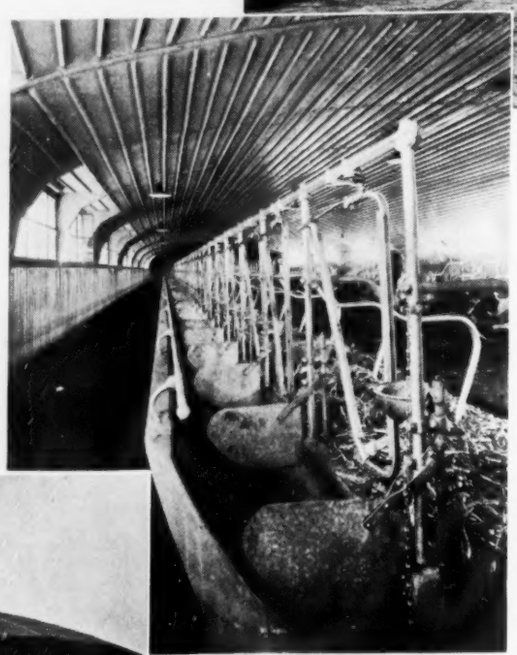
Fire, Wind No Terror to Metal Farm Buildings

FEW sounds are more terrifying to the average farmer than the cry of "Fire!" Each year fire and wind wreak an estimated \$150,000,000 worth of damage to farm buildings and stock—a heavy burden to the rural population which for decades has been debt-ridden and practically at the mercy of the elements.

Metal farm buildings supply one answer to the farm fire hazard; pioneering in this field has been the James Mfg. Co., Fort Atkinson, Wis. This company has designed new types of barns, crop keepers, silos, stables and other buildings common to most farms, all of metal construction.



Lower illustration shows a Jamesway metal barn—low, sturdy and solidly anchored to withstand winds, grounded to deflect lightning, clad with galvanized sheets inside and out, and protected from the weather by two layers of wall insulation. Roof is self supporting as shown in the center illustration, the arched metal ceiling reflecting light. Metal doors, windows and equipment are used throughout.



Frame of the barn is shop fabricated in four sections to each truss, bolted together at the eaves and at the roof ridge. Trusses, shown in the top illustration are placed 5 feet apart and cross tied. One-half section of the center span weighs only 110 pounds; sidewall stud weighs 60 pounds.

Hot dip galvanized iron sheets are used to line both interior and exterior surfaces, these wall sections also being shop fabricated to fit interchangeably. They are secured to the frame with self-sealing lead headed nails. A considerable amount of malleable iron castings is used in equipping these buildings. These are also all hot dip galvanized.

With no haymow in the barn, resort is made to metal crop keepers, seen in the background of the top illustration. This equipment actually "cans" the hay, ventilation being effected through a center core and an outer ventilating wall. Surfaces of the inner walls which support the hay are perforated; air flowing upward through the wall flues extracts moisture from the hay.

One of the newest types of crop keepers provides for storing two forage feeds—silage and cut hay. This design has two units, one within the other, the inner unit for silage and the outer for cut hay. Ventilation walls are provided on both sides of the outer ring in which chopped hay is stored.

July 8, only a tattered festoon of roadbed wreckage was left hanging over the gorge

Watkins Glen VIADUCT REBUILT *in Record Time*

August 4, derrick cars swinging heavy girders into place

ON JULY 8, 1935, unprecedented cloudbursts and floods had swept a whole region in New York and Pennsylvania and, along with much other damage, washed out the double-track viaduct of the New York Central Railroad, 165 feet above the gorge at Watkins Glen, N. Y.

ON JULY 12, first information on which to start rebuilding the structure was given to American Bridge Company

ON JULY 22, ten days after first information, American Bridge Company had prepared shop drawings, Carnegie Steel Company had turned out mill material, fabrication had been completed, and all the new steel needed, making up a trainload of 23 cars, left the Ambridge plant.

ON AUGUST 5, twenty-four days after first information, steelwork for both tracks was erected, roadbed for one track in place, and traffic resumed by passage of the first train over the rebuilt viaduct. A day later, everything was ready for laying the roadbed of the second track.

ON AUGUST 24, the viaduct was completed, to the driving of the last rivet.

July 22, loaded train of 23 cars leaving Ambridge, Pa.

IT was an unusual demonstration of swift action and ample resource that was called for in rebuilding the viaduct at Watkins Glen. Such demands do not often arise; but American Bridge Company facilities and personnel are always at command for adequate performance, not only on emergency projects but on any undertaking in the use of structural steel.

AMERICAN BRIDGE COMPANY

GENERAL OFFICES: *FRICK BUILDING • PITTSBURGH, PA.*

Baltimore Boston Chicago Cincinnati Cleveland Denver Detroit Duluth Minneapolis New York Philadelphia St. Louis Salt Lake City

Pacific Coast Distributors: Columbia Steel Company, San Francisco • *Export Distributors:* United States Steel Products Company, New York

United States Steel Corporation Subsidiary

create enough vacuum in the filter flask to draw acid from the carboy.

A different siphoning arrangement is employed to empty a full carboy into an acid vat at one operation. The carboy is plugged with a cork and two glass tubes, both of which extend to the bottom of the carboy and both of which fill with acid to the level inside. One tube is a siphon that runs out, over and down into the vat below. The other tube parallels the first one and connects with it at the bottom of the bottle. Outside it is topped by a rubber bulb.

Pressing the rubber bulb forces acid up into the siphon tube until it spills over and starts a flow down into the vat below. As the carboy can be emptied easily and safely by this method, danger of acid burns from splashing is practically eliminated.

Wear Resisting Steel Is Used in Concrete Mixer of New Design

A CONCRETE mixer having an end discharge has been developed by the Ransome Concrete Machinery Co., Dunellen, N. J. It meets conditions in the building of bridges where the side discharge type cannot be moved up close enough to the work. The machine is built in two sizes having capacities, respectively, of 7 and 10 cubic feet per batch. Incorporated in the design are all of the necessary features for rapid transportation from job to job and trailing behind an ordinary motor truck without the necessity for loading and unloading.

Great care has been exercised in the design of this mixer and the selection of materials of construction. The mixer drum, the most important part, is made of a steel shell and flanged heads welded together. The shell is of normalized, wear-resisting, steel plate containing 0.40 to 0.50 per cent carbon and the mixing blades are of the same material.

Drum tires are of rolled steel welded to the drum shell and turned true after the drum has been completely assembled. The drive gear is a semi steel casting containing nickel and chromium, as is also the pinion meshing with it. The mixer frame is of structural shapes completely welded.

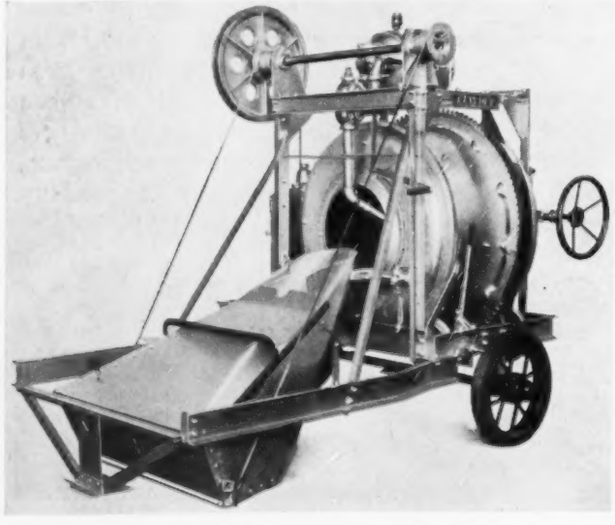
Drum rollers are car wheel iron, chilled on face and flanges and ground true. They are equipped with two Timken bearings each and supported in alloy steel shafts. The drive shaft is of S. A. E. 1035 steel running in Hyatt bearings on ball and socket hangers.

Made Easily Portable

The mixer is mounted on coil springs and the wheels have rubber tires. Weight of the mixer is so distributed that when the mixer is tilted to the position for towing, the weight is balanced on the axle; at the same time one man is able to lift the mixer up to position for towing. The towing pole is detachable and the mixer frame extended around the power loader skip, forming a safety guard for the skip without in any way interfering with the operation of loading the skip. The loading skip has a streamlined shape and elevates to such an angle that no shaking is necessary to get the batch into the drum. All controls are grouped at one point.

Riveting on this machine is confined almost entirely to the loading skip and to the overhead frame, parts on which a power riveter can be used advantageously. Practically all other details are welded.

The two sizes complete weigh, respectively, 3330 and 4600 pounds. Excluding the engine, the weight of iron and semisteel castings in these machines is about 20 per cent and of steel castings about 1½ per cent. The remainder is composed of structural steel, steel plate, steel shafting and wheels.



CONCRETE mixer with end discharge, for use where side discharge type cannot be moved close to work, is built of wear resisting steel

Tin Binary Alloys Shown In Equilibrium Diagrams

Equilibrium diagrams of binary alloys of tin have been compiled into a booklet by the International Tin Research and Development council, 149 Broadway, New York. The volume contains 67 diagrams relating to binary alloys of tin, with 34 other elements. It is edited by Ernest S. Hedges and C. E. Homer and is designated as technical publication, series B, No. 2, of the council's issues.

It is designed as an aid to the research worker as indicating which groups of alloys are likely to be capable of improvement and development; to the practical man concerned with preparation of alloys of tin for specific purposes as a guide to attainment of the properties he desires.

Constitution of binary alloys and interpretation of equilibrium diagrams are concisely explained in the introduction as an aid to those who have not studied the subject previously. Diagrams are arranged alphabetically according to the name of the element alloyed with tin. Beneath each diagram is a table of data regarding temperatures of the various transformations and ranges of composition, expressed in percentages by weight of the alloys in which they occur.

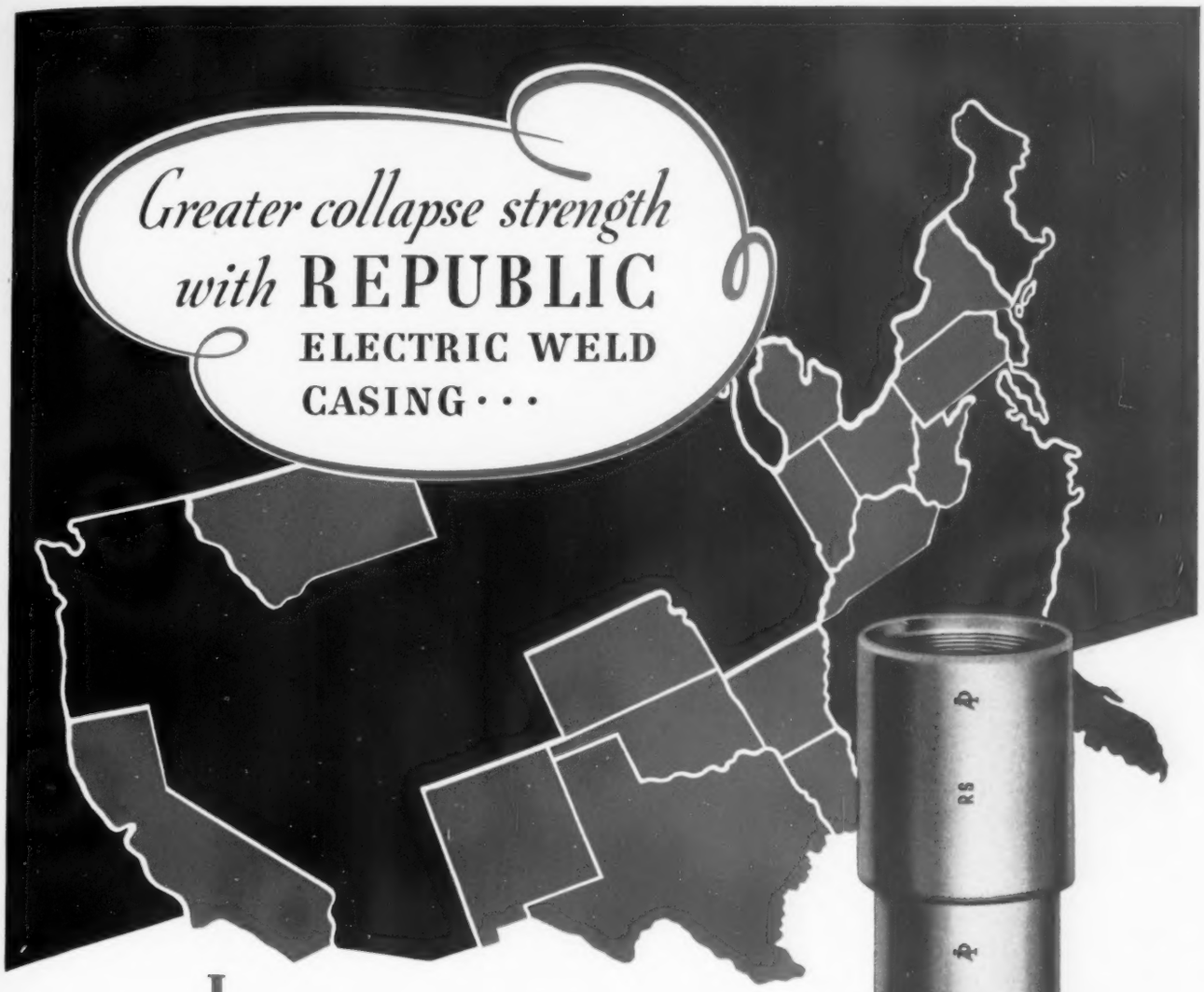
Copies are available without cost from L. J. Tavener, United States representative of the council, at the above address.

Offers Pickling Inhibitor With Improved Properties

A new pickling inhibitor for which distinctive advantages are claimed has just been announced by E. F. Houghton & Co., Philadelphia. Based on the theory that it is not necessary to attack metal to remove scale, the new product—tradenamed Ferritrol No. 100—represents the outcome of years of investigations and research.

Efficiency of an inhibitor, accord-

Greater collapse strength with REPUBLIC ELECTRIC WELD CASING · · ·



IN a comparatively short time, more than twenty million feet of Republic Electric Weld Casing and Tubing has been shipped. Not a single joint has collapsed in the hole.

The high resistance to collapse of Republic Electric Weld Casing and Tubing is due to the "high yield point with high ductility" steel, the perfect roundness of the product and its uniform wall thickness.

Failures in casing are due either to collapse or casing pulling out of the coupling. Resistance to collapse and strength of joint are both dependent upon the yield point of the steel. Since Republic Electric Weld Casing and Tubing are made by a cold process, the yield point is much higher for the same tensile than in pipe made by hot processes.

Roundness and uniform wall thickness are vital factors in resistance to collapse, since a tube 1% out of round has about 25% lower resistance to collapse. These factors are also vital to joint strength, because they insure uniform thickness of metal under the roots of the threads.

Only in casing and tubing made by the cold process—only in casing and tubing made by the electric resistance welding method—is it possible to combine the factors that make possible such a high degree of safety and economy in use. Write for Handbook of Setting Depths and Bursting Pressures.

Republic Steel CORPORATION

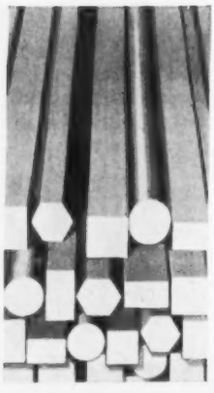
GENERAL OFFICES · · · YOUNGSTOWN, OHIO

REPUBLIC

HIGH YIELD POINT — ELECTRIC WELD — HIGH DUCTILITY

CASING · TUBING

Eyes on Steel



EACH of the countless details involved in the production of Bethlehem Carbon Bars is carried out under the critical eyes of metallurgical observers who see to it that the steels possess the qualities needed in the intended service. At every step of production—melting, pouring, soaking, rolling, chipping, inspecting—the steel is under the alert scrutiny of these men.

This system of metallurgical observation demands exceptional devotion to detail on the part of the steel-maker. But it lightens the task of the user. It places in his hands Bethlehem Carbon Bars that excel in ease and economy of fabrication, of finishing, of heat-treatment.

BETHLEHEM STEEL COMPANY

GENERAL OFFICES: BETHLEHEM, PA.

ing to the company's research staff, depends on the nature of the film, its ability to plate on in the presence of much disturbance, its thickness after deposition, its lack of porosity, its dielectric strength, its ability to withstand heat without breakdown and last but not least its eventual solubility in the rinse.

Working along these lines, the company's research department developed an inhibitor possessing unusually high strength. It is heat resistant far above pickling temperatures and will not break down at 220 degrees Fahr. Its use is claimed to prevent pitting or loss of steel and leave a chemically clean surface.

Another distinct advantage is the ability to use this inhibitor together with copper sulphate for coprodizing. Parts are pickled in the usual manner in tanks containing a 5 per cent sclution of sulphuric acid and the necessary amount of Ferritrol No. 100. To the contents of this tank is added a small quantity of copper sulphate. As the scale is pickled off, copper deposits on the steel to provide protection against rust. Ordinarily, inhibitors do not allow copper to plate on steel in the pickling process.

Revised Handbook on Arc Welding Design, Practice

Procedure of Arc Welding Design and Practice, third edition; 596 pages, 5¾ x 9 inches; published by Lincoln Electric Co., Cleveland; supplied by STEEL, Cleveland, for $1.50, plus 15 cents for postage; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

The present volume is some 140 pages larger than the preceding one. Encyclopedic in scope and contents, the new handbook is divided into eight principal sections, each of which deals with an important phase of arc welding. The text is written in a simple, concise manner and is profusely illustrated, there being over 700 illustrations consisting of detailed drawings and photographs. Practically every use and application of arc welding is covered.

New features include the following: American Welding society specifications for filler metal; method of determining the amount of current carried by the electrode; procedures, speeds and costs for making all types of welds in sheet metal; A.S.M.E. boiler code requirements for butt welds in heavy plate; hard facing of ferrous metals; examples of redesigning for arc welding; use of arc welding in making and repairing cutting tools and dies; speed of welding oil and gas pipe lines, etc.

Written especially for the use of designers, engineers, welding supervisors and operators, the *Procedure Handbook* serves as a practical guide to all interested in arc welding.

WELDING, et cetera . . .

BY ROBERT E. KINKEAD

IN THIS column, the author, well-known consulting engineer in welding, is given wide latitude in presenting his views. They do not necessarily coincide with those of the editors of STEEL.

Acetylene

AN ACCIDENT caused by failure of the runner on one of the water turbines at Niagara Falls sprung the main shaft about ⅝-inch in 20 feet. The shaft was 36 inches in diameter. A man straightened the shaft with an oxyacetylene welding torch in about six hours.

There are no newspaper headlines in a job like that; but it seems to have some significance. There are more than 200,000 oxyacetylene torches in use every day in this country. But behind those torches in useful service is a story as exciting as any story ever written about discovery and invention. It is a story of relentless effort to make oxygen and acetylene serve the needs and desires of the human family.

On Nov. 12 the International Acetylene association will convene in Cleveland. Internationally known scientists, engineers, inventors, will consolidate their positions and plan new campaigns into unconquered territory. Battle-scarred veterans of field engineering will bring in their reports and take away new ideas and rekindled enthusiasm from their contacts with the scientists.

Set Good Example

The companies which comprise the International Acetylene association are successful and prosperous. They pay good wages, good salaries and fair dividends to investors. They enjoy no special privileges except those which come from having brains and industrious habits. Their undivided attention is concentrated on their own business which is that of making it advantageous for people to buy their products.

If the administrators of the New Deal were interested in organizing human effort along constructive lines, they would do well to study the men and the companies of this group. This would seem to us to be more productive than paying farmers, who do not know how to farm, good borrowed government money for not farming; building power plants where there is no need for power; organizing government factories to produce at twice the cost of private manufacturers.

Education

A steel fabricator built a welded steel floor in a bridge in Ohio. It warped so badly that heroic measures were required to make the bridge serviceable at all. Observing engineers reported that a great deal was learned from the experience. Putting the hand on a hot steam pipe is also instructive but the knowledge gained in this way is not exactly new. How to control warping on a structure such as was welded in this case has been known and in print for ten years. These gentlemen apparently agree with the old Japanese proverb which says that a very expensive education is better than no education at all. At any rate, disregard of all prior experience is one good way to get an expensive education.

Weld Metal

Weld metal will behave precisely the same as unwelded parent metal provided it has identical chemical and crystalline qualities, the same mechanical treatment, the same "age", the same kind, degree and location of residual stresses, and discontinuities which are identical in degree and location. Such a condition is, to say the least, improbable.

A metal may be considered weldable when the variations of performance of weld metal are not too great to make the resulting weld useless. A weld is a joint between pieces of metal which may be better or worse than the metals joined, but it is never identical to them.

DEFINITE

ADVANTAGES OBTAINABLE ONL

IN HORIZONTAL RADIANT TUB

● The Horizontal Type Heating Elements in Surface Combustion Radiant Tube Annealing Covers have many advantages not possible in other types of heating elements. They permit longer gas travel. They give *higher efficiency* due to greater heat transfer. They permit more accurate control of heat distribution. They permit *controlled* uniformity. They produce highest quality annealing. *They produce more tons of quality annealed sheets per capital invested.* And these results are produced in actual operation, at a *lower fuel consumption per ton* than ever attained by any known equipment. Investigate these facts!

Surface Combustion Corporation

TOLEDO, OHIO Sales and Engineering Service in Principal Cities

NNEALING COVERS

Advantages that are Facts! They prove why SC Horizontal Radiant Tube Covers give higher quality annealing at lower cost per ton of annealed steel.

● Surface Combustion Alloy Radiant Tubes have given lowest fuel consumption in annealing sheets, and a tube has never burned out.

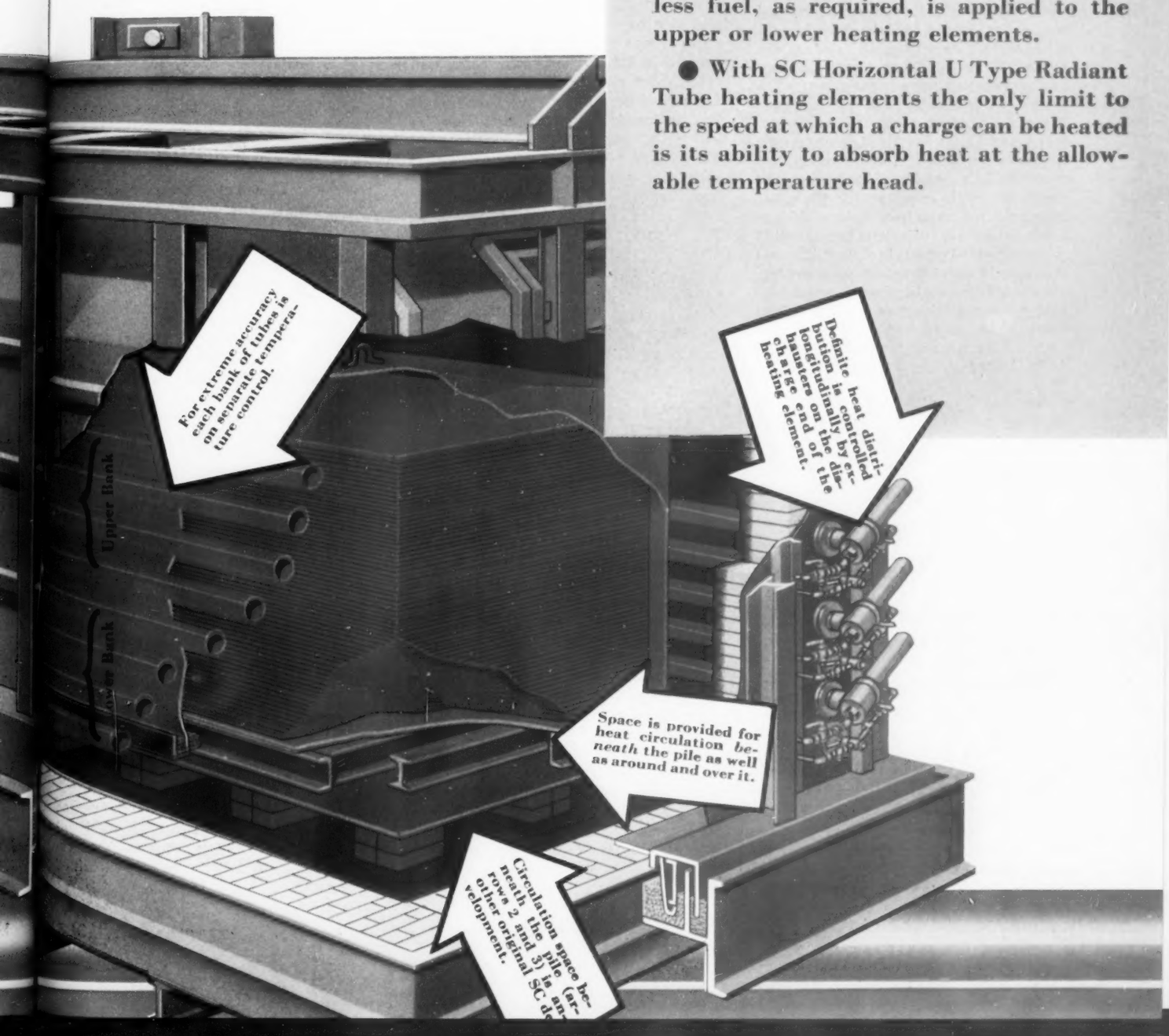
● Heat is supplied to the horizontal tubes by radiation, the fastest known method of heating. SC Annealing Covers are the only covers using this superior method of firing.

● This method of firing provides a more accurate means of heat distribution than is otherwise possible.

● Horizontal Radiant Tube heating elements provide the only method of heating sheets that permits *definite* control of the amount of heat transferred to the charge from top to bottom.

● Depending upon the width of the sheets and the height of the pile, more or less fuel, as required, is applied to the upper or lower heating elements.

● With SC Horizontal U Type Radiant Tube heating elements the only limit to the speed at which a charge can be heated is its ability to absorb heat at the allowable temperature head.


For extreme accuracy each bank of tubes is on separate temperature control.
Upper Bank
Definite heat distribution is controlled longitudinally by exhausters on the discharge end of the heating element.
Space is provided for heat circulation beneath the pile as well as around and over it.
Circulation space beneath the pile (arrowe 2 and 3) is an other original SC de velopment.

POWER DRIVES

Installation Precautions

Before starting any new transmission equipment check the lubrication because even a test run to see if connections are correct may have serious consequences. Speed reducers have been damaged by being run dry.

Antifriction bearings in motors and other equipment usually are lubricated by the manufacturer. However, oil may have leaked out when the equipment was tipped during shipment or storage. The same is true of ring-oiled and other bearings with oil reservoirs.

Speed reducers, chain cases, and other equipment which contains an oil reservoir are often shipped, chain cases always, without the lubricant. The manufacturer may have used a heavy oil or "slush" on finished surfaces to protect them during shipment and until installed, which may be some months after assembly. To remove this coating, flush out the reservoir with gasoline, or kerosene followed by gasoline, before filling. Even when the oil chamber is filled when received emptying, flushing and refilling is good practice as a protection against accidents, carelessness and even maliciousness which might occur between assembly and installation. The proper level for refilling is indicated by an oil gage or overflow plug.

Too much oil also may cause trouble by heating and expanding thus using extra power to drive because of the churning load, and perhaps destruction of oil seals.

Some types of flexible couplings require lubricants; other types do not. If used, the lubricant must be applied after the coupling is installed. Follow the manufacturer's recommendation as to quantity and type of lubricant, if any.

♦ ♦ ♦

Preventers vs. Fixers

Only a few years ago the reputation of a maintenance man was largely based on his ability to "nurse" a hot bearing till the end of the day and then his willingness to work as much of the night as necessary to get the equipment in shape to operate the following day. In the up-to-date plant of today, the maintenance man's knowledge of prevention is considered to be of greater importance; applying the "cure" is merely exercising his trade.

Prevention consists in regular, systematic inspection, proper lubrication, and adjustments made when necessary to prevent parts working loose and out of alignment. A maintenance man who fully appreciates that a few minutes spent in "prevention" will save hours of labor spent in making repairs and the replacement of parts which have failed in service is worth much more than a good "fixer."

Almost always it is easier, quicker and less expensive to replace a worn part before it fails than afterward, because a failure in service may, and often does result in considerable additional damage. In any case, when prevention is exercised the time for doing the work can be set when most convenient. Failures often come at most inopportune times.

♦ ♦ ♦

Lost R. P. M.'s

Machine tools usually are provided with some means, such as cone pulleys or gear boxes, for changing spindle speeds to accommodate work involving different diameters, tools and materials. Generally spindle speeds at each change point are tabulated for the convenience of the operator. Since these tabulations are based on a predetermined drive speed they are not only misleading, if incorrect, but responsible for actual production losses when the operator depends upon them and speeds his machine accordingly.

Modern machine tools in the larger sizes are commonly provided with dependable power drives. Group operated machines can be made dependable too with properly engineered drives and the proper allowances for necessary speed losses. Investigations of lineshaft pulley sizes and reduction ratios indicate that in many cases no allowance has been made for even the decrease in motor speed under load even though this speed drop is indicated on the motor nameplate. Using pulleys because they are on hand even though not the right diameter for the best speed ratio is also a prolific cause of lost r. p. m.'s. All of these causes of lost speed can be prevented with a little care and practical engineering.

Pulleys subjected to excessive slippage and abrasive dusts wear rapidly. Few engineers appreciate that a decrease of ⅛-inch in the diameter of a 6-inch drive pulley will result in a loss in belt speed of slightly over 2 per cent and a corresponding loss in the speed of the machine driven, assuming that the machine or lineshaft pulley is unchanged.

♦ ♦ ♦

Gearless Variable Drive

Transmission engineers interested in variable speed units will find some unusual features in a recently developed gearless drive in which variation in speed is obtained by shifting the positions of three rollers to alter their course on the curved race.

One difficulty with friction drives has been the problem of maintaining sufficient pressure between the rollers and races when subjected to overloads. In this unit, the manufacturer states, the pressure is maintained and increased automatically in proportion to the torque load by an automatic pressure device which utilizes the imposed load itself to generate the required pressure.

Speed control is obtained through a small handwheel mounted on the top of the unit, which can be connected up for automatic or remote operation. When the unit is stopped the speed control automatically returns to the low speed position for starting.

Output speed with a standard 1750-revolutions-per-minute motor is infinitely adjustable from 600 to 3600 or from 560 to 5600 revolutions per minute, ratios of 6 to 1 of 10 to 1, respectively, depending upon the unit size. The unit is built in 12 different capacities with output ratings at high ratio speeds ranging from 1 to 20-horsepower. The motor is built integral with the unit.

♦ ♦ ♦

Every trouble-making drive can be tamed. Many times the solution is so simple that it is overlooked because of its obviousness.

♦ ♦ ♦

The automobile is responsible for a higher appreciation of the importance and necessity for the proper care, lubrication and maintenance of all mechanisms.

♦ ♦ ♦

When a machine fails to produce as scheduled, the operator may not be at fault; the drive may not have been engineered, installed or maintained properly.

New Type Base for Electric Iron Formed By Broaching

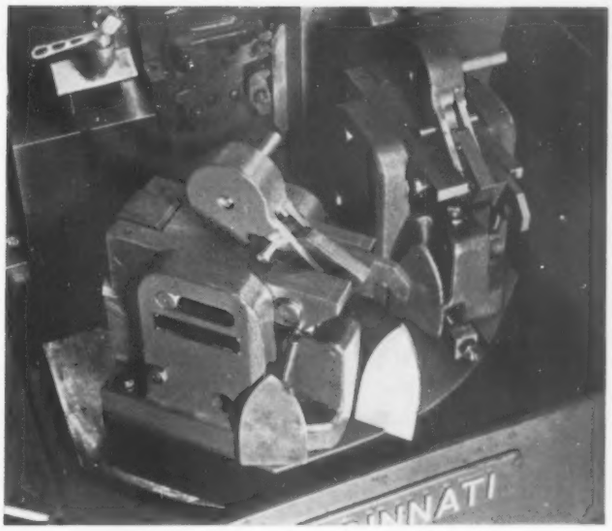


Fig. 1—Oscillating table of broaching machine showing fixtures in which parts are placed in angular position

PROBABLY no other process in the machining of metals has made more progress or revealed a wider range of possibilities than broaching. Applications that now are accepted as common practice would have been considered fantastic several years ago. Even today it is impossible to determine what the future limit of broaching procedure will be.

From a beginning that was built upon simple operations utilizing this process, engineers gradually attempted more complicated jobs. Typical of the attainments that have been made is the broaching of a new style steel base of an electric iron, Fig. 2. This project gave engineers of Ex-Cell-O Aircraft & Tool Corp., Detroit, an interesting but difficult problem.

Curvature Presents Problem

Basically, the job required a tapered angular surface from the heel to the point of the electric iron base. The angle to be held is 25 degrees. At no place along the entire length of either side is a true radius formed. Greatest width of the part is about 2 inches from the heel, and on either side of this dimension is a different, constantly changing curve.

The solution was the sectional broach, Fig. 3, with an unusually large cutting surface. This tool, constructed of high speed steel, embodies a form that is unique and necessarily had to be developed with extreme care and precision. The parts are placed in a 25-degree angular position for broaching which further complicated the required form on the broaches. A pair of broaches was necessary, inasmuch as a right and left-hand tool was required to broach both sides of the iron's base.

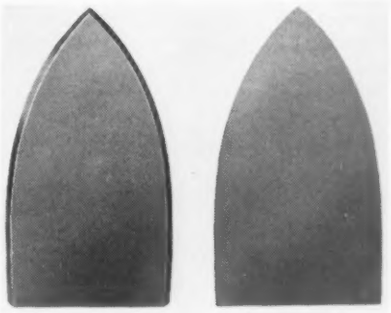


Fig. 2—Base of electric iron before and after broaching

Three parts were placed in each station of a two-station, oscillating table on a vertical type of broaching machine built by Cincinnati Milling Machine Co., Cincinnati. As shown in Fig. 1, one side of the fixture is in the working position while the opposite station is in the loading position. In other words, the oscillating table brings the fixtures alternately into broaching position.

The flat iron base is a steel stamping, 9/32-inch thick. Total stock removed is 5/32-inch. The sectional surface broach, two of which are employed, has a total length of 45 inches and a developed width of cut of 7⅝ inches. Cutting speed is 20 feet per minute and production reaches 390 pieces per hour.

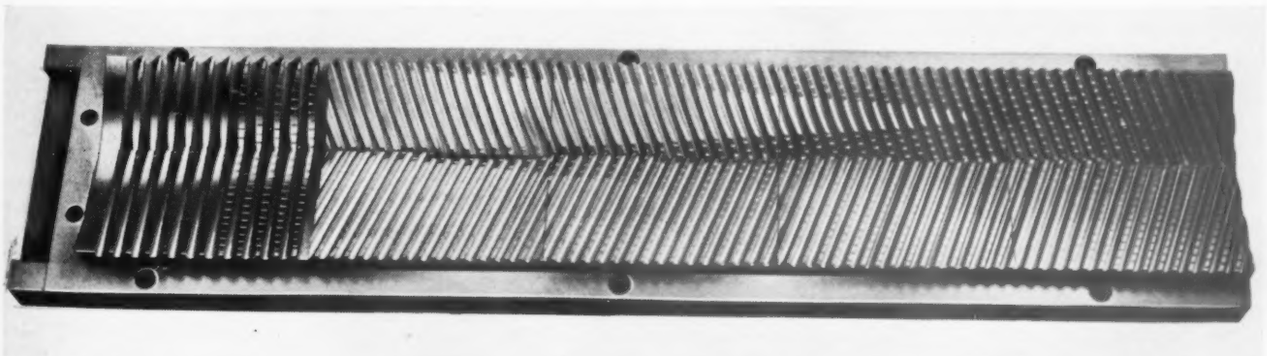


Fig. 3—Sectional surface broach of unusual form designed to machine a tapered angular surface from the heel to the point of an electric iron base

LARGE USES OF STEEL IN SMALL WAYS

299th Article ◆ Ground Clamps

WHILE the steel industry has long been known as a tonnage industry, producers with the passing of years have come to value more and more the almost innumerable small outlets for steel. This has been particularly true in recent depression years, when the requirements of many large consuming industries dropped sharply. As never before, attention has been devoted during this period to the development of new uses, and no item has proved too small, for it has been revealed that these small outlets aggregate a good tonnage annually.

One of these items is the radio ground clamp, which consumes possibly 60 tons of strip a year and about 10 tons of $\frac{3}{16}$-inch screw rods. The strip is usually $\frac{5}{8}$-inch wide by 0.140-inch thick, round edge, quarter hardened, cold finished. Manufacturers are able to produce 10 clamps from a pound of steel. The accompanying illustration is reproduced by courtesy of the Eagle Electric Mfg. Co., Brooklyn, N. Y.

The strip is first blanked for length, pierced and given one form on one machine. The pieces are then put on a different press and in one stroke given two additional forms. The first form is the tongue at the end, which, in the final assembly is opposite the arm containing the clamping screw; the other two forms represent the remaining two angles, as illustrated. The final fabricating operations involve the tapping of the two holes for the clamping screw and the binding screw.

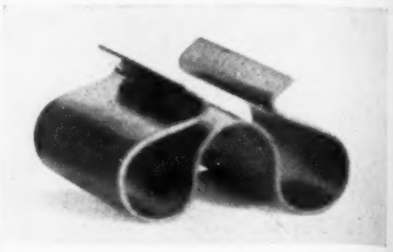
It is not necessary to tumble these parts, although a certain amount of tumbling is effected in the plating. Cadmium is used as a special corrosion-resistant due to the fact that the clamps are often used in damp places.

The adjustment screw is of $\frac{3}{16}$-inch rod steel, the screws running about 100 to the pound. They also are cadmium plated and assembled into the clamps by hand with motor-driven screwdrivers. The binding screw is of brass with a special wire retaining washer.

Develops Expander for Split Skirt Alloy Pistons

A steel piston expander for use on all split skirt alloy pistons has been developed by the Hastings Mfg. Co., Hastings, Mich. It not only widens the slot in the conventional manner but forces the piston skirt outward at right angles to the wrist pins, restoring the piston to its approximate original shape. Resiliency of the expander permits the piston automatically to expand and contract, enabling it to function at peak efficiency under all engine temperatures.

Placed in the most effective zone, says the company, the exceptionally long tensional surfaces of the new expander exert their energy evenly over the full length of the slot, thus securing equal expansion both at the top and bottom of the skirt. This feature allows the expander to function without excessive wall pressure or piston drag. The new unit is easy to install and cannot fall out.



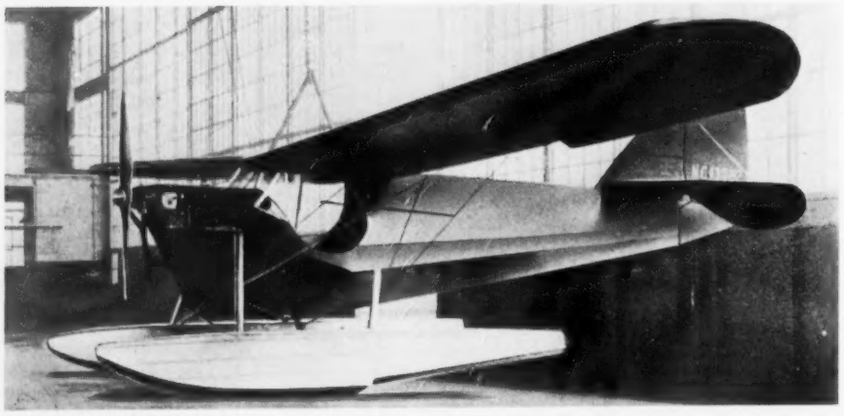
New expander for split skirt alloy pistons not only widens the slot but restores the piston to its approximate original shape

The new expander is made of cold rolled, annealed spring steel of 0.020 gage, hardened and drawn so as to leave a blue finish. The stock is put in rolls and then run through a special machine which forms the expander. The finshed product, illustrated herewith, weighs about 0.30-ounce.

New Rustproofing Process Protects Surface Finish

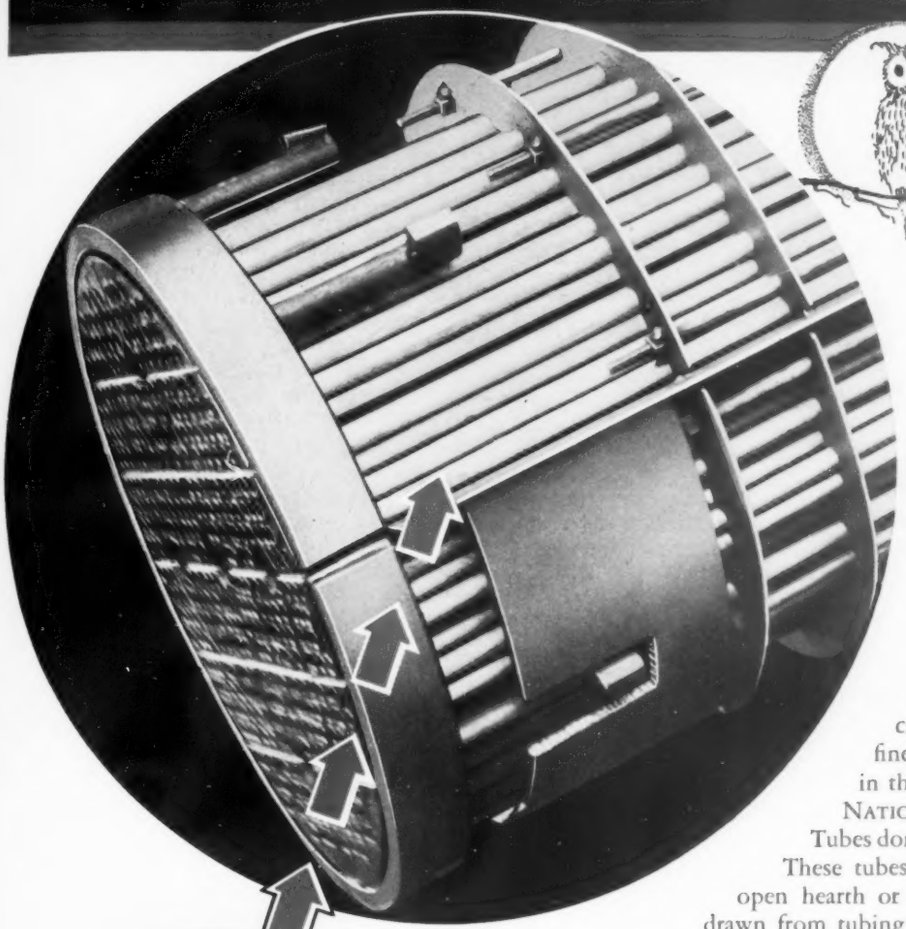
Low cost is claimed for a new rustproofing process which is adapted to protecting any type of steel surface regardless of size, shape or previous processing. Tests made by automobile manufacturers show that the treatment will at least triple the life of the finish on steel units. To obtain this unusual type of protection, steel products are dipped in a bath or sprayed with a solution of a proprietary chemical called Cromodine. Only one minute is required for this treatment. The metal first is cleaned and following the chemical treatment is rinsed and dried. Paint applied over steel treated in this manner has a luster because there is no rough coating to absorb paint irregularly. Moreover, the steel has the effect of oxidizing the lower part of the finish film, forming in effect a cement that firmly binds the paint to the metal. The process was developed by the American Chemical Paint Co., Ambler, Pa.

Stainless for Strength, Minimum Weight and Safety



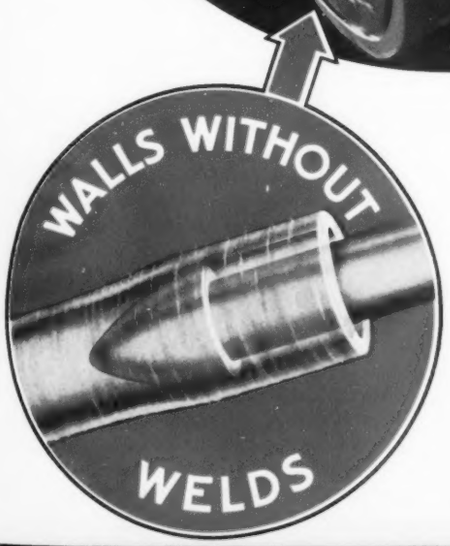
SEAPLANE PONTOONS OR FLOATS built by Fleetwings Inc., Bristol, Pa., are entirely of 18-8, *chromium-nickel, stainless steel. According to Electromet Review, published by Electro Metallurgical Co., New York, each float, although weighing only* 42 *pounds, has a loaded displacement of* 1114 *pounds of water. All joints are shot-welded. No painting or covering is applied; the metal completely resists sea water as long as the surfaces are kept reasonably free of marine deposits*

THE WISE CHOICE



for heat transfer operations

The various products handled by modern heat transfer devices, from delicate food materials to the crudest vapors and liquids of large refineries, necessitate careful consideration in the choice of the tubes. This is why NATIONAL Condenser and Heat Exchanger Tubes dominate in selection by wise operators. These tubes are made from the highest quality open hearth or electric furnace steel and are cold drawn from tubing produced by the piercing of solid billets. The walls, therefore, are entirely without weld or seam and structurally uniform and sound from end to end. After the final cold-drawing, tubes are heat-treated so they can be readily rolled into headers, flanged, bent, coiled or otherwise manipulated. Steels of varying analyses are used to meet different requirements, from the U S S 18-8 Stainless Steel for food handling to the inexpensive low-carbon boiler tube grade for less exacting uses. In your next selection, be wise in your choice, try NATIONAL Condenser and Heat Exchanger Tubes. NATIONAL engineers will gladly give advice in the choice of the best material for the particular purpose intended. Correspondence is invited.



NATIONAL TUBE COMPANY · Pittsburgh, Pa.

Pacific Coast Distributors—COLUMBIA STEEL CO., San Francisco, Calif.

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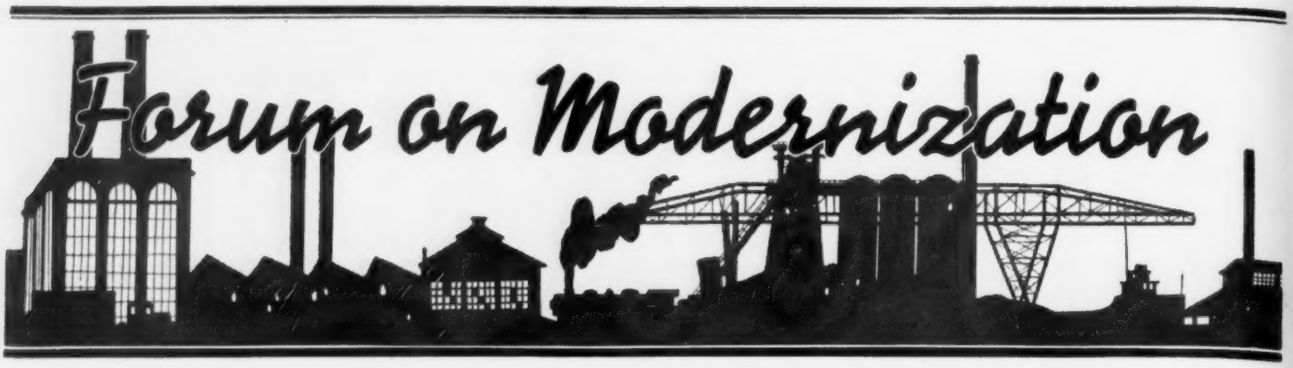
NATIONAL CONDENSER and HEAT EXCHANGER TUBES



When Can New Machines Equipped with Cemented Carbides Be Used Profitably?

BY W. G. ROBBINS
Vice President and General Sales Manager,
Carboloy Co. Inc., Detroit

THEORETICALLY a machine becomes obsolete the moment an improved type capable of producing given work more economically and efficiently is developed and made available. However, in practice the obsolescent stage is reached over a much longer period. This varies according to the type of business in which a concern is engaged and the degree of progressiveness of its management. The period ranges from the one extreme of a relatively short period of use in the well-financed, progessive concern, manufacturing on a production basis and selling in a highly competitive market, to an indefinitely long period in the plant less active and more restricted from the standpoint of cash reserve. In the first instance a reduction in cost per unit produced is the major consideration and the cash outlay for new equipment necessary to effect that saving is of secondary importance. In the second instance, acquisition of new equipment is limited due to the investment cost involved, despite the obvious savings which could be effected in production costs per piece.

Economy Must Be Proved

In between these two extremes stands the average plant financially able to make moderate purchases of new equipment within a reasonable period when convinced that such purchases will prove economical.

Being a manufacturer and merchandiser of cemented carbide tools reaching a complete cross section of the metalworking industries, the Carboloy Co. is in a good position to obtain a broad perspective on the advantages of modernization insofar as the use of this relatively new tool material and new machine tools are concerned. Perhaps no single development during the past ten years has focused to such an extent the attention of industry upon the advantages of new machine tool equipment, than has the advent of cemented carbides in 1928.

Unquestionably, new machine tools, especially designed for cemented carbide use, having complete rigidity and capable of running at high speeds are desirable when the *highest* order of performance is expected from carbide tools. There are, however, a number of factors which should govern the decision as to the purchase of new machine tools for use with cemented carbide. A few brief case studies probably will illustrate best some of these factors.

Case Histories Reviewed

Case I. A large automotive manufacturer found that the purchase of six new lathes, tooled with cemented carbide, could effect a saving of 17 cents per piece and do the work of 12 old lathes. This being a quantity production job, the saving per piece more than justified the purchase of new equipment.

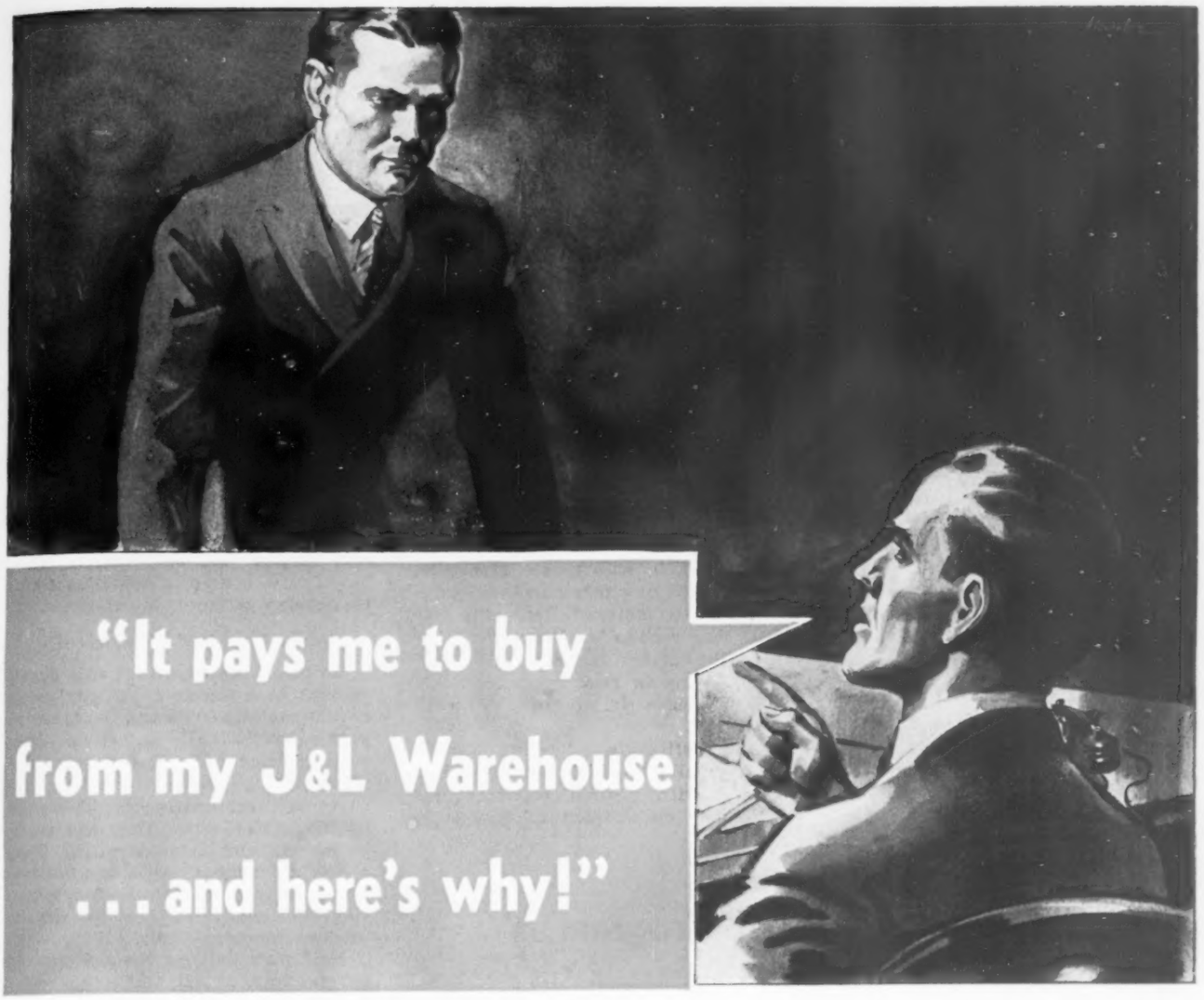
Case II. A manufacturer of mechanical parts desired to make a substantial increase in production. Analysis of the machining operation seemed to indicate that a desirable increase could be obtained through the use of new machines. However, further investigation revealed that equipment used on prior operations also would have to be replaced or supplemented to keep the new machine tool equipment running at full capacity. Inasmuch as the company did not feel prepared to make this additional investment, it was, of course, not advisable to purchase the new machine tool equipment. In this case, the installation of carbide tools on the existing equipment increased production up to the capacity of the prior operations.

Case III. A manufacturer of braking equipment found that, due to the ability of carbide tools to take light cuts on their castings just under the scale, the amount of surplus metal ordinarily allowed for machining could be reduced 1/16 on all surfaces to be milled. It was estimated that this would produce yearly saving of more than $4500. However, due to the lack of rigidity in their existing milling machines satisfactory cutter life could not be obtained. They purchased two new milling machines, the cost of which was quickly absorbed by savings obtained through production increase, longer tool life and saving in surplus metal.

Broaching Saves Two Operations

Case IV. A large automotive company was fabricating its valve guide bushings by means of a series of three operations—milling, boring and grinding. Broaching was investigated but found to be impractical, due to the short broach life. With the advent of tungsten carbide the life of the broaches was increased sufficiently to put the operation on a commercial basis. Broaching machines were subsequently purchased, and this one operation now replaces the three operations formerly required. Obviously a substantial saving—more than justifying the cost of new equipment—was effected.

Case V. A fair sized job shop had the opportunity to bid on a large quantity of cast iron plugs for oil barrels. The machining operations were turning, facing and threading. To meet the price required to obtain the order they purchased two new turret lathes equipped with tungsten carbide. They were able to write off



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"Modern cutting, bending and forming equipment in my J & L Warehouse gives me steel of the exact size and shape I need—steel that is more nearly ready for the service I want to put it to than I can get from other sources. By getting steel in this ready-to-use form, I save time, reduce my manufacturing operations and costs and thereby increase my profits.

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The next time you need steel—call your J & L Warehouse. Regardless of the size or diversity of your order, it will be filled promptly, accurately and with quality products by friendly and intelligent warehouse personnel. Remember—your J & L Warehouse offers you—for every need—the right quality of steel in a full range of sizes. Send for complete Stock List—no obligation.

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the investment in new equipment during the life of the contract, deliver the plugs cheaper and make a larger profit than would have been possible were these plugs produced on their existing equipment.

These cases illustrate a few typical conditions encountered. There are many other examples; for instance, often a manufacturer finds it desirable to substitute a new, harder, tougher alloy for the existing metal used on a given part. Such alloys naturally impose more severe cutting requirements upon the machine. In order to maintain the former production output it is frequently necessary to install new, more powerful machines to stand up under the speeds required. Then, too, the use of harder metals often makes mandatory the use of cemented carbides. These in turn make it possible to run at greatly increased speeds—speeds at which the older machine tools may not operate satisfactorily. To take full advantage of the potential production increase and savings in cost possible with the cemented carbide installation, the purchase of new machines becomes advisable.

Another considerattion frequently encountered is the possibility of eliminating a grinding operation through the better quality of finish obtained with carbide tools. To increase the quality of finish sufficiently for this necessitates the use of a highly rigid machine which eliminates chatter. In many instances a new machine is desirable or necessary. The decision regarding its purchase rests in such cases on the extent of the saving which can be made by eliminating the grinding operation, as well as the value of the resultant production increase.

A further representative example of cases in which the use of new machine tools is indicated is on operations where precision boring may be substituted for reaming, as for example on the crankshaft bearings of connecting rods. In this case the degree of quality desired, or necessary, is the determining factor. The trend in this instance is decidedly toward precision boring, using cemented carbide tools.

The above examples may serve as some indication of the many factors which necessarily affect a decision as to the economy, and other advantages, which will result from the purchase of new machine tool equipment. These factors fall roughly into four major classifications:

1. Production increase,
2. Saving in production cost.
3. Increase in quality of work produced.
4. Substituting of new, harder, tougher alloys, which cannot be machined with desired economy and efficiency on existing equipment in plant.

Equipment Replacement Program Is One Key to Continuing Profits

BY NORMAN D. MACLEOD*

President and General Manager, Abrasive Machine Tool Co., East Providence, R. I.

THE recent Machine Tool Show must have created a variety of impressions in the minds of those who had the good fortune to see it. No doubt the average visitor was struck by the size of the undertaking. Then came ideas of beauty of design, of speed and power, of simplicity and ease of operation, and of the increase in use of hydraulic and electric drives. But how many were impressed with the possibility of modern machine tools as an investment?

Contemporary history indicates that about six or seven years ago, this country was in the throes of a prosperity of proportions unknown, at least in our generation. Factories and mills were working almost to their limit of capacity, and full use was being made of the tools at our disposal. Some of these tools were good tools, too, and brought their owners returns beyond fondest expectations. High-speed steel and Stellite cutting tools were being used extensively and enabled even the older machines to turn out a greater amount of work in a given time.

Then came the sad awakening. Dreams of fortunes, with attendant ease and luxury, came tumbling down around the financier, the office worker, and the laborer alike. The machines were shut down, factories and mills closed. Production of goods ceased, or practically so. For nearly five years, the heavy goods industries at least, have remained dormant.

But what of the machines? How have they fared and what are the possibilities of using them again? There they are, just where we left them five or six years ago. Outside of a good coating of rust and dust, they look as though they might do us a good turn again. But will they?

During all this period of unrest and business stagnancy, a change has been going on, a change which has been unfolded and brought to light at the Machine Tool Show of 1935. Men have been out of work and factories have been quiet, but the brains of many hundreds of clever engineers have been working overtime. Without the distracting influences of busy times, they have been able to function clearly and accurately. They have had the time to experiment and to develop without interference.

Tools Improved Concurrently

At the same time that this development in machine tools was going on, the metallurgists and the abrasive people have also been active. New cutting elements have been developed which double, triple, and even quadruple past performances. These are no idle statements. They can easily be proved and demonstrated. They are only dependent upon one reservation, and that is, that these new cutting elements give best results on modern machine tools.

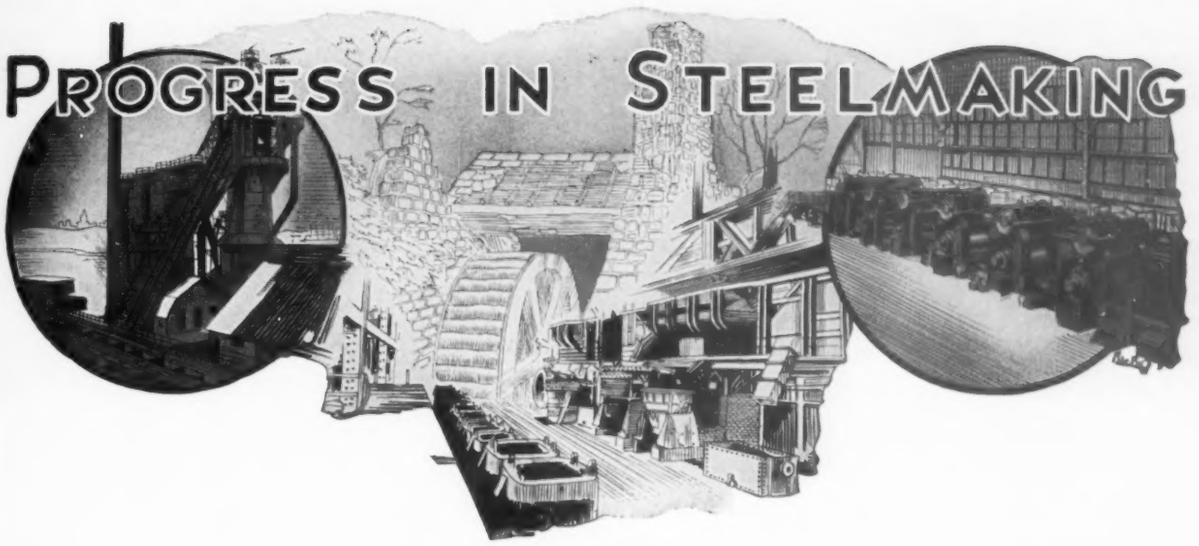
Now let's look at the dollars and cents angle of all this. Assuming we are going to pay just about so much per hour to a workman, whether he operates an old machine or a new one, we have some basis to go on. If he is getting 60 cents per hour and can turn out twice as many pieces on the new machine as he can on the old one, then the saving is 30 cents per hour, or $12 per week. At the same time he is saving direct labor costs, there is at least an equal amount of burden saved. Therefore, the total saving is $24 per week, or $1200 per year. On a machine costing $4800 this would be a return of 25 per cent, which in any language, would represent a fair return on the investment.

Disregarding the embarrassing and costly shutdowns for repairs, and the inaccurate work coming from old machines, it seems as though the investment possibilities of new machines would be overpowering. How can any manufacturer using old machine tools compete successfully against the one who has a real replacement program in effect? Obviously, the answer is, that he cannot. Yet those who have the purchasing power in plant after plant will say, "Well, I guess we can get along

(*Please turn to Page* 64)

*Mr. MacLeod recently (STEEL, Nov. 4) was elected president of the National Machine Tool Builders' association, succeeding Charles J. Stilwell, vice president, Warner & Swasey Co., Cleveland.

PROGRESS IN STEELMAKING



New Coating Is Acidproof

Protection of metal is afforded by a new transparent coating which can be applied by brushing, spraying, dipping, coating machine, or with a soft cloth without showing brush or lap marks. The product is water, weather and acid-proof; is flexible, tough and nonskid wet or dry; and resists temperatures varying from 60 degrees below zero to 520 degrees Fahr. When the liquid is added to paint in the proper proportion of 1 pint or more to the gallon, the coverage is increased 33 1/3 per cent and more, and the life, luster and wearing qualities at least 50 per cent. Any paint vitalized with the product is highly resistant to all weather conditions, erosion, corrosion, oxidation and is proof against scaling, chipping, chalking and alligatoring. An interesting application of the coating is made by a steel company which operates ore cars in the Mesabi ore region. The cars are painted with a paint vitalized with this commodity, the coating having withstood the extreme variations of temperature during the past four years. The consumer reports the paint highly satisfactory in that it "sticks to the job."

• • •

Prolongs Life of Runners

Longer life for iron runners at blast furnaces and pig machines has been made possible by the application of a new coating instead of clay wash. The clay runner is made up in the usual manner and dried thoroughly. A thick creamy solution of the new coating then is applied with a broom similar to the usual method for applying clay or loam washes to iron runners, and this is allowed to dry. The coating is said to have a considerable higher refractory value than clay or loam, practically no shrinkage when dried and, therefore, does not crack. The wash fills all the cracked places in the clay runner thus permitting iron from penetrating the clay when the first cast of iron goes over the runner; it also makes the scrap easier to pare off and prolongs the life of runners thus saving clay and labor.

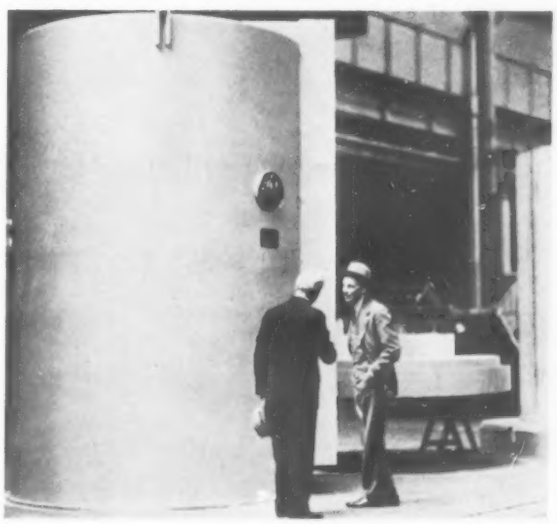
• • •

Serves As Die Lubricant

A concentrated preparation composed of approximately 18 per cent of electric furnace graphite dispersed in distilled water and known as Aquadag now is available as a die lubricant for drawing tungsten and molybdenum, or as a lubricant in cases where oil is either objectionable or dangerous.

Employs Large Electric Furnaces for Annealing Steel Strip

STEEL COMES THROUGH BRIGHT AND CLEAN—Thirteen bell-type electric annealing furnaces, larger than any of this type heretofore constructed, will serve the new continuous strip mill of the Ford Motor Co., Dearborn, Mich. Each is of sufficient capacity to bright anneal, in one charge, two 16,000-pound coils of strip 48 inches wide, 52 inches outside diameter and 30 inches inside diameter. The units, which were built by the General Electric Co. will afford an annealing cycle of only about 45 hours. The charge is covered by a sheet-alloy retort, and this in turn by the bell furnace.. Controlled atmosphere is maintained within the retort, surrounding the charge. Heat is supplied by heating elements in the side walls and by a central element which extends into the stack of coils. Even distribution of heat and acceleration of the heating and cooling cycles are assisted by central heating element. After the steel comes uniformly up to temperature, the furnace is lifted and a water spray is applied to the outer surface of the retort. A fan in the base of the furnace agitates the protective gases to aid in accelerating the cooling cycle. This combination of central heating element, fan, and spray was developed to provide a high rate of heating and cooling; it also contributes to the high uniformity in the steel



IMPROVING OPEN-HEARTH FURNACE DESIGN

by William C. Buell Jr.

Chapter XI — Part II

Flues

SUMMATED angularity of the five types of flue layout delineated in Figs. 181 and 182 are listed in Table CXXXVII. The values shown are for only one side of the interconnected system. As 360 degrees of angularity will absorb at least 1 inch of water draft the value of such an analysis will be apparent.

Symmetry of layout and minimum angularity are the first factors of flue design. The second includes the development of appropriate areas in order that the fluids may pass at velocities that will not create excessive friction and draft loss. The details from the typical furnaces as to flue size, area, fluid flow, temperature and velocity are given in Table CXXXVIII. The designating nomenclature of the several components of the flue system may be identified by reference to Fig. 181. The various flue sizes listed are taken from the original drawings. The areas of the several flues, which are all considered as having semicircular roofs are solved by the use of the chart Fig. 183, which will be found convenient for the analysis or selection of flue sizes.

The volumes of the fuel gases, Table CXXXVIII, column c, are from Table XCII as are the furnace gas volumes, columns r and w. The volumes of the waste gases to the gas system, column h, are in the cases of the producer and mixed gas fired furnaces 40 per cent of the total furnace gases. In the cases of fixed fuel fired furnaces, the furnace gases to the gas and air systems are divided as the ratios of the areas, columns g and l.

The temperature values, columns d, i and n, are as previously developed, while those of columns s and x are arbitrary, but selected as consistent with normal radiation losses. The velocities of columns e, j, o, t, y, dd and ii are solved through the application of equation 23 (STEEL, May 15, 1933, page 30).

The ultimate purpose of such an analysis as is shown in Table CXXXVIII is the presentation of the speed of fluid flow in well considered contemporary furnace flues for the determination of the most effective rates in order that existing design may be improved. Accordingly, the following comments are offered. Bearing in mind that in order to minimize friction losses, it is well to construct flues of ample proportions to cause low velocities. The velocities of the producer gas in the several furnaces fired by this fuel, column e, are entirely satisfactory, especially when it is recalled that relative velocities up to 90 feet per second at the gas nozzle, A_3, are necessary to pass the volumes of operation. At such velocity the equivalent pressure is nearly 2 inches of water and this pressure must exist substantially throughout the system. For design purposes a convenient velocity value is 20 feet per second, which should be held, as

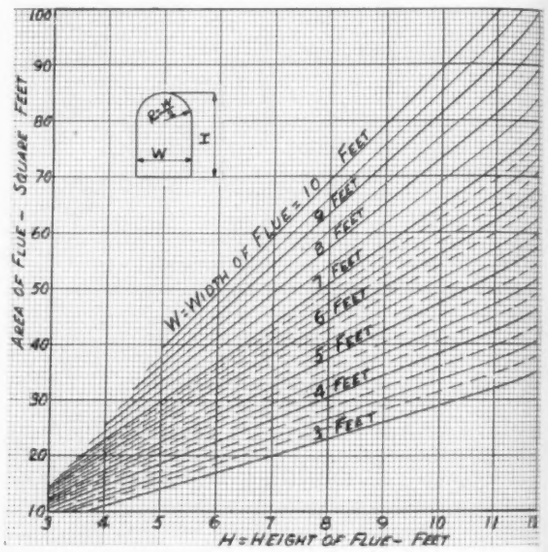


Fig. 183—Solution of flues which are designed with semicircular roofs

Table CXXXVII

Summated Angularity of Illustrated Flue Layouts, Degrees

Figure	Gas System: Fuel flue	Gas System: Waste flue	Air System: Inlet flue	Air System: Waste flue	Collecting flue	Stack and flue[2]	Summated angularity
a	b	c	d	e	f	g	h
181-A	90	90	135[1]	90	—	90	495
181-B	90	120	135[1]	171½	—	90	452½
181-C	90	90	135[1]	90	90	90	585
181-D	90[3]	90	90[4]	90	90	90	540
182	90	90	90[4]	—	—	90	360

[1] If air inlet is set atop the flue, deduct 45 degrees.
[2] If stack and waste heat boiler flues are developed symmetrically, add 45 degrees.
[3] If producer gas is the fuel.
[4] Another 90 degrees is required for air entrance into gas regenerators.

lower velocity likely will cause unnecessary loss of producer gas temperature.

The velocities through the waste systems, columns j and o, must be less than the velocities in the collecting flues or in the stack flue, if the former is omitted.

The critical velocities of the effluent system thus will be found in these components, columns t and y. The velocities ascribed furnaces A, N and O of the A group are too high. With the waste heat boilers and the flues clean, and the induced draft fan operating effectively, production rates probably will be satisfactory, but with the boilers or flues fouled, or in natural draft operation, production rates would be expected to suffer. It is believed that 20 feet per second relative velocity should be the design maximum in the collecting or stack flue with producer gas operation.

If the future application or firing with producer gas is beyond the bonds of possibility, then the basis of the design of the collecting or stack flue in fixed fuel firing may well be taken as 15 feet per second relative velocity.

The effective stack area, column aa, Table CXXXVIII, is calculated for a diameter 4 inches less than the diameter shown, column z. Thus, the effective area of a 6 foot diameter stack is calculated from a diameter of 5 feet 8 inches. This to make allowance for the ring of gas adjoining the brickwork and assumed to become static through capillary action. Such a ring while undoubtedly existing is likely much thinner than the 2 inches depth ascribed, and probably its thickness varies greatly with velocity.

Much has been written regarding

Table CXXXVIII

Details of Size and Flow—Flues of the Typical Furnaces

Furnace	GAS SYSTEM FUEL Flue-A14 Size	Area, ft.²	Fluid, ft.³/sec.	Temp., deg. Fahr.	Velocity ft./sec. as at 32°	GAS SYSTEM WASTE Flue-A16G Size	Area, ft.²	Fluid, ft.³/sec.	Temp., deg. Fahr.	Velocity ft./sec. as at 32°
	a	b	c	d	e	f	g	h	i	j
A	3'0"x6'6"	18.5	211.0	1350	21.8	3'0"x6'6"	18.5	177.2	1350	18.3
J	4'0"x3'3"	12.0	183.0	1350	29.2	4'0"x5'9"	22.2	153.7	1350	13.3
K	3'3"x7'3"	21.2	192.8	1350	17.5	5'0"x7'3"	35.0	161.9	1350	8.9
N	3'6"x6'3"	20.5	255.0	1350	23.8	4'0"x5'6"	20.5	214.0	1350	20.0
O	3'6"x7'6"	25.0	278.0	1350	21.3	4'0"x7'6"	28.5	233.2	1350	15.7
I	4'6"x5'9"	24.0	—	—	—	4'6"x5'9"	24.0	98.3	1250	7.6
P	4'0"x4'6"	16.5	—	—	—	4'0"x5'0"	18.5	121.0	1250	12.2
G	—	—	—	—	—	4'0"x5'0"	18.5	114.0	1250	11.5
L	4'3"x7'6"	30.1	107.5	500	5.0	4'3"x7'6"	30.1	136.4	1250	8.4
B	—	—	—	—	—	4'0"x7'1"	27.0	96.0	1250	6.6
D	3'6"x4'6"	14.4	—	—	—	4'0"x5'6"	20.5	90.0	1250	8.2
E	—	—	—	—	—	3'9"x5'6"	19.0	106.5	1250	10.4
H	—	—	—	—	—	5'0"x3'6"	14.9	73.6	1250	9.2
F	—	—	—	—	—	5'0"x7'6"	35.0	89.3	1250	4.8
M	—	—	—	—	—	—	—	—	—	—

Furnace	AIR SYSTEM WASTE Flue-A16A Size	Area, ft.²	Fluid, ft.³/sec.	Temp., deg. Fahr.	Velocity ft./sec. as at 32°	COLLECTING FLUE Flue-A17 Size	Area, ft.²	Fluid, ft.³/sec.	Temp., deg. Fahr.	Velocity ft./sec. as at 32°
	k	l	m	n	o	p	q	r	s	t
A	4'2"x6'6"	25.6	265.8	1350	19.9	4'2"x6'6"	25.6	443.0	1250	32.2
J	5'0"x6'0"	27.4	230.6	1350	16.1	—	—	—	—	—
K	5'9"x7'3"	40.3	242.9	1350	11.5	—	—	—	—	—
N	5'0"x7'6"	35.0	321.0	1350	17.6	5'0"x7'6"	35.0	535.0	1250	28.4
O	5'0"x7'6"	35.0	349.8	1350	19.2	5'0"x7'6"	35.0	583.0	1250	31.0
I	6'6"x8'3"	49.0	200.0	1250	7.6	7'0"x8'6"	54.0	298.3	1100	9.8
P	5'0"x5'0"	22.3	132.0	1250	11.0	—	—	—	—	—
G	5'6"x5'9"	28.4	174.5	1250	11.5	6'3"x5'9"	32.0	288.5	1100	15.9
L	5'0"x7'6"	35.0	204.6	1250	10.9	6'0"x7'6"	41.3	341.0	1100	14.7
B	4'0"x7'1"	27.0	96.0	1250	6.6	—	—	—	—	—
D	4'0"x5'6"	20.5	90.0	1250	8.2	4'6"x5'6"	21.8	179.5	1100	14.7
E	4'3"x5'6"	21.8	122.0	1250	10.4	5'0"x5'6"	25.0	228.5	1100	16.3
H	(2) 4'6"x3'6"	27.6	136.0	1250	9.2	4'6"x6'4½"	26.5	209.6	1100	14.1
F	(2) 5'10½"x4'9"	51.2	131.0	1250	4.8	5'6"x7'6"	38.0	220.3	1100	10.3
M	6'0"x6'3"	33.7	247.0	1250	13.7	6'0"x6'3"	33.7	247.0	1100	13.1

Furnace	STACK FLUE Flue-A19 Size	Area, ft.²	Fluid, ft.³/sec.	Temp., deg. Fahr.	Velocity ft./sec. as at 32°	STACK Stack-A20 Size	Area, ft.²	Fluid, ft.³/sec.	Temp., deg. Fahr.	Velocity ft./sec. as at 32°	WASTE HEAT BOILER FLUE Flue Size	Area, ft.²	Fluid ft.³/sec.	Temp., deg. Fahr.	Velocity ft./sec. as at 32°
	u	v	w	x	y	z	aa	bb	cc	dd	ee	ff	gg	hh	ii
A J K N O	4'8"x6'6"	28.0	443.0	1200	29.0	6'0"Φ	25.1	Same values as column W	Same values as column x	32.3	4'8"x6'6"	28.0	same values as column w	Same values as column x	29.0
	5'0"x7'0"	32.5	384.3	1200	21.7	6'0"Φx150'	25.1			28.0	5'0"x7'0"	32.5			21.7
	—	—	404.8	1200	—	—	—			—	—	—			—
	4'8"x7'6"	32.8	535.0	1200	26.7	7'0"Φ	34.8			28.2	(2)6'3"x7'6"	86.0			10.2
	4'8"x7'6"	32.8	583.0	1200	32.6	7'0"Φ	34.8			30.7	(2)6'3"x7'6"	86.0			12.4
I P	7'0"x8'6"	54.0	298.3	1050	9.7	8'0"Φx180'	46.1			11.6	7'0"x8'6"	54.0			9.7
	7'0"x6'4½"	39.5	253.0	1050	11.2	8'4"Φ	50.3			9.0	5'6"x6'4½"	32.0			13.8
G L	7'0"x9'0"	57.5	288.5	1050	8.8	8'0"Φx225'	46.1			11.2	6'3"x9'6"	55.2			9.2
	6'0"x7'6"	41.3	341.0	1050	14.4	7'0"Φx200'	34.8			17.5	5'0"x7'6"	35.0			17.0
B	7'0"x7'1"	44.3	192.0	1050	7.6	7'0"Φ-Isley	34.8			—	—	—			—
D	4'6"x5'6"	21.8	179.5	1050	14.4	5'6"Φx155'	20.8			15.4	4'6"x5'6"	21.8			14.4
E	5'0"x5'6"	25.0	228.5	1050	16.0	8'0"Φx175'	46.1			8.9	5'0"x5'6"	25.0			16.0
H	4'6"x5'7½"	23.1	209.6	1050	15.8	5'6"Φx154'	20.8			18.0	4'6"x6'4½"	26.5			13.8
F	5'0"x7'6"	35.0	220.3	1050	11.0	8'0"Φ	46.1			8.4	5'0"x7'6"	35.0			11.0
M	6'0"x6'6"	35.3	247.0	1050	12.2	7'6"Φx165'	40.1			11.0	5'0"x6'6"	30.0			14.4

PROGRESS IN 1935

pave

THE 1936 Yearbook issue of **STEEL**, dated January 6, 1936, will picture, to a greater extent than recent annual issues, the parade of progress in the iron, steel and metalworking industries. Instead of placing emphasis upon the problem of government—industry relations, as was the case in the issues of 1933, 1934 and 1935, the 1936 Yearbook will be devoted principally to the timely and appropriate service of interpreting for **STEEL**'s readers the great significance of the improvements in materials, methods and equipment recorded during the past year.

1935 HIGH POINT IN CREATIVE DEVELOPMENT

Progress in the industries served by **STEEL** touched an all-time record in 1935. More important new steels and non-ferrous metals in rolled, cast and other forms were introduced than in any previous year. The improvements in methods of production, processing, shaping, treating, fabricating, machining, etc., were more extensive and significant than in any earlier 12-month period. In equipment, progress in 1935 has been so marked that the year probably will go down in history as the date of a great renaissance in design and construction. The almost incredible advances in machine shop equipment, which astounded visitors to the now world famous machine tool show held in Cleveland in September, were symbolic and typical of the marked, and in some cases revolutionary improvements that characterized new equipment in many branches of the iron, steel and metalworking industries in 1935.

PROFIT POTENTIALITIES FOR 1936

As yet, few individuals in industry fully appreciate the economic significance of these changes. Every new or improved material, every method involving greater efficiency and every advance in the design or construction of equipment contributes directly to enhance the opportunities for companies in the metalworking industries to operate more profitably.

One of the main objectives of **STEEL**'s Yearbook of 1936 will be to explore the profit potentialities of 1935 progress. A series of specially prepared articles will be presented to show the expectancy for 1936 in the consumption of materials and use of methods, equipment and supplies in eight principal markets. These are the main outlets for the products and services of the metalworking industries. The extent of the business booked in these fields in 1936 will determine to a large extent the character of the balance sheets of Dec. 31, 1936. We believe **STEEL**'s presentation of the opportunities in these markets has profit potentialities for the company of every reader. Supplementary to these analyses, **STEEL** will present, in connection with its advertising inserts on light and heavy engineering equipment, comprehensive tabulations of the new or radically redesigned furnaces, mills, material handling apparatus, machine tools, welding and cutting apparatus, heating and treating equipment, foundry and forge shop equipment, electrical equipment of all kinds—in fact everything in equipment required in the metalworking industries from mine to manufactured product.

EXPLORING EIGHT FIELDS FOR PROFIT

In addition, the 1936 Yearbook also will include **STEEL**'s annual survey of engineering progress. As in the past, this will embrace comments on noteworthy engineering achievements by 100 or more of the nation's leading authorities on metallurgy, steelmaking, rolling mill practice, heat treating, forging, foundry practice, galvanizing and other coating operations, stamping, welding, power transmission, etc.

WHAT 100 EXPERTS THINK

WHO MAKES WHAT?

In response to the unprecedented interest in new materials, **STEEL** will

STEEL's YEARBOOK

...way for PROFITS IN 1936

present, as a supplement to its long established advertising insert on steel and steel products, a new up-to-date directory of special and alloy steels. This promises to be the first comprehensive compilation to include the many new alloys introduced commercially in 1935.

STEEL's regular exclusive features including the "Business Trend", "Windows of Washington", "Mirrors of Motordom", "Methods and Materials", "Progress in Steelmaking", "Power Drives", "As the Editor Views the News", etc., will be a part of this issue. This is in accordance with **STEEL**'s policy of making its annual Yearbook issue conform to the pattern it is using for regular issues throughout the year.

TIME-TESTED EXCLUSIVE FEATURES

Statistically the 1936 Yearbook will be superior to any of its predecessors. It will contain **STEEL**'s 14th annual compilation of the distribution of finished rolled steel to principal consuming groups, (inaugurated by **STEEL** in 1922) and figures on production and distribution of alloy steel which will be more comprehensive than has been possible in previous years. **STEEL**'s annual tabulation of new furnaces, mills and other equipment installed during 1935, statistics on world production of pig iron, steel, ingots and castings, per capita production of iron and steel in the leading industrial nations, iron and steel exports of the principal countries and complete price tables for all products covering recent years. A complete summary of iron, steel and other markets for the United States and for the principal European countries will be presented.

WHERE IT GOES—

Over 10,000 copies will be distributed to the outstanding companies in the iron, steel and metalworking industries. The Producer, Fabricator, Manufacturer, Engineer and Banker find this volume of great assistance in checking past performance and laying future plans.

WHO READS IT—AND KEEPS IT—

Many thousand executives—presidents, proprietors, vice presidents, secretaries, treasurers, works and general managers, purchasing agents, engineers and foremen know, read and preserve the Yearbook for the completeness of its information and its continuous reference value.

What Kind of Copy to Use and Why—

Copy should be a combination of straight display and catalogue type. The Yearbook supplements the week to week issues, so advertising should be prepared to arrest attention at the first reading and also be sufficiently complete to make it of continued reference value. A campaign of advertising brings out either (A) individual points of a product—one point to an issue—or (B) covers the entire line—one item at a time. Advertising in the Yearbook should present all the points or all the products. Make it the "Master Advertisement" of the campaign; or if used singly, tell the whole story of your product, process or service.

WHY ADVERTISING VALUE—PLUS

Because of the admitted value of the Yearbook from the editorial standpoint the advertising it contains is unusually important. This advertising serves to complete the story—is available for reference throughout the year and when properly planned is an important supplement to any yearly campaign.

The Where-To-Buy directory—complete and accurate as to advertisers—supplies information to buyers on thousands of individual products, processes and services.

OF INDUSTRY ISSUE

JANUARY 6, 1936

stacks as used in connection with steam boilers, when the gases enter the stack at temperatures below 600 degrees Fahr. but little or nothing has been offered apropos of the much higher temperatures of open-hearth practice.

All of the equations offered for the solution of draft intensity in boiler operation are entirely empirical, and if solved for the higher temperatures of open-hearth operation give values at wide variance with observed results.

Based on many observations in open-hearth plants, a value of 0.10-inch of water draft per each 100 degrees difference between the atmospheric temperature and the furnace gas temperature at the base of the stack, per each 100 feet of stack height above the bridgewall of the furnace has been found to give results that agree closely with actual draft readings. The equation is:

$$D = 0.10\left(\frac{t_1 - t_a}{100}\right)\left(\frac{H}{100}\right). \quad (56)$$

in which:

D = Draft at base of stack, inches of water.

t_1 = Temperature furnace gases, base of stack, degrees Fahr.

t_a = Temperature surrounding air, degrees Fahr.

H = Height of stack above furnace bridge wall, feet.

The equation solved for stacks

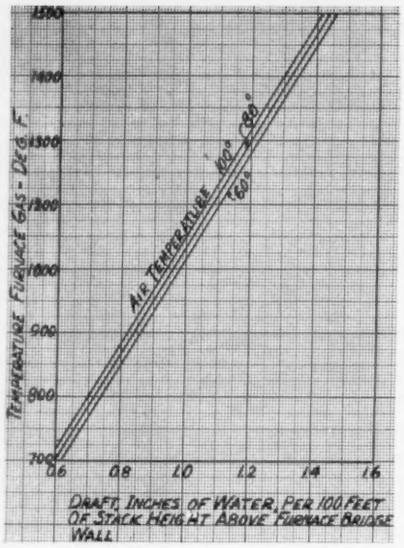

Temperature Furnace Gas - Deg. F.
Air Temperature 100° 80° 60°
Draft, Inches of Water, Per 100 Feet of Stack Height Above Furnace Bridge Wall

Fig. 184—Chart depicting the solution of Equation No. 56

100 feet above bridgewall is plotted in Fig. 184. The draft will vary directly for stack heights other than 100 feet.

The intensity of draft is solely the product of stack height and temperature difference. Thus in accordance with the foregoing equation the height of the stack must be increased as practice is improved, indicated by a lower furnace gas temperature bettered in order that a high draft, essential to rapid production may be maintained.

Prior to the addition of waste heat boiler equipment, the operating record of furnace G has been especially noteworthy. The high stack, 225 feet, may have contributed materially in making this record. For best operation with natural draft it would seem that stacks should extend at least 175 feet above ground.

Absorbs Portion of Draft

The velocity of gases in a stack absorb that draft value necessary to create the speed. Thus the 30.7 feet per second relative velocity assigned in the stack of furnace O, column dd, will absorb about 0.2-inch water, of the available draft (Fig. 46, STEEL, May 22, 1933, page 33) while the 9-foot velocity furnaces, P and E, will absorb but 0.015-inch water draft. Thus, ample diameter to assure a low velocity will reduce the requirements of height to accomplish like available draft, or if stacks are of similar height, will increase the available draft.

As the stack is but a continuation of the flue system, the comments regarding the velocity as found and that assumed as desirable in the discussion of the values in connection with the collecting and stack flues will be of similar weight when applied to stacks.

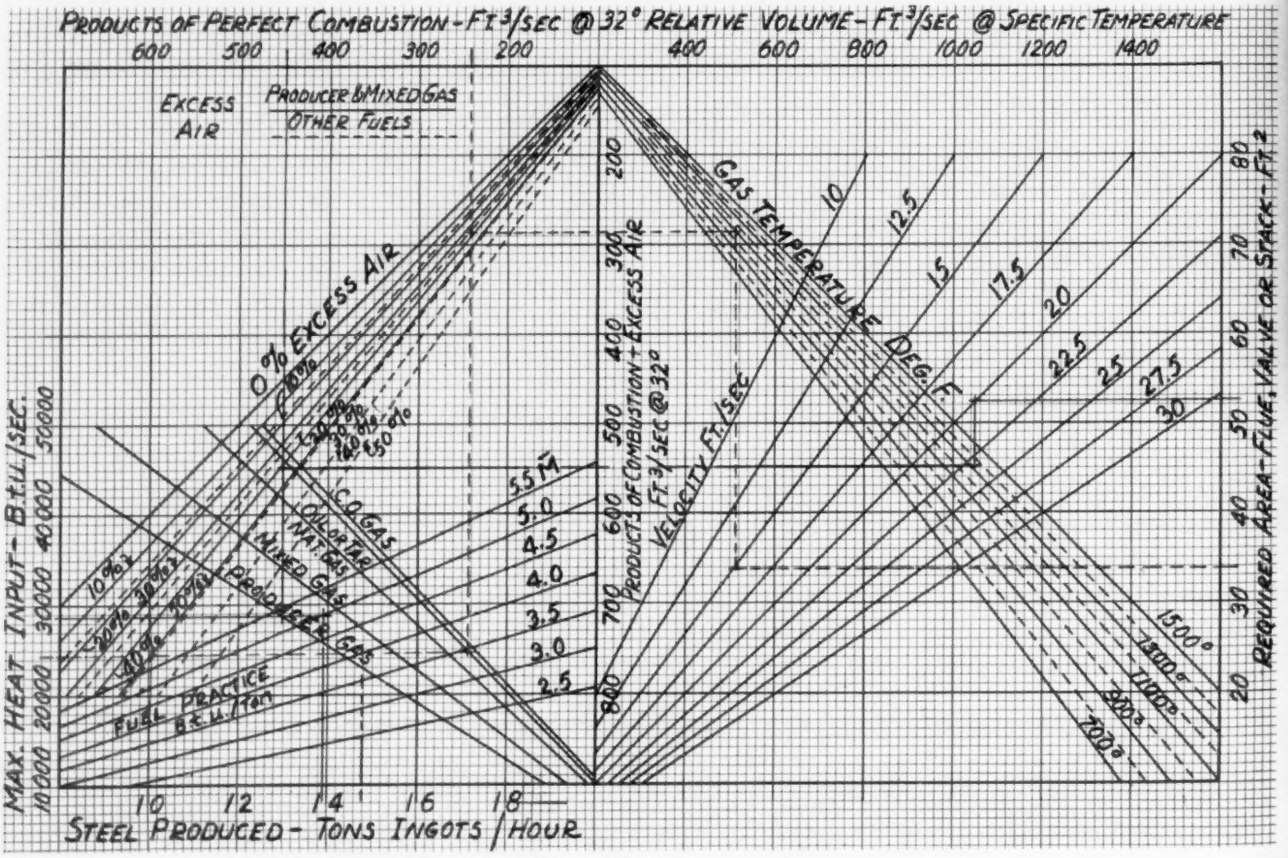
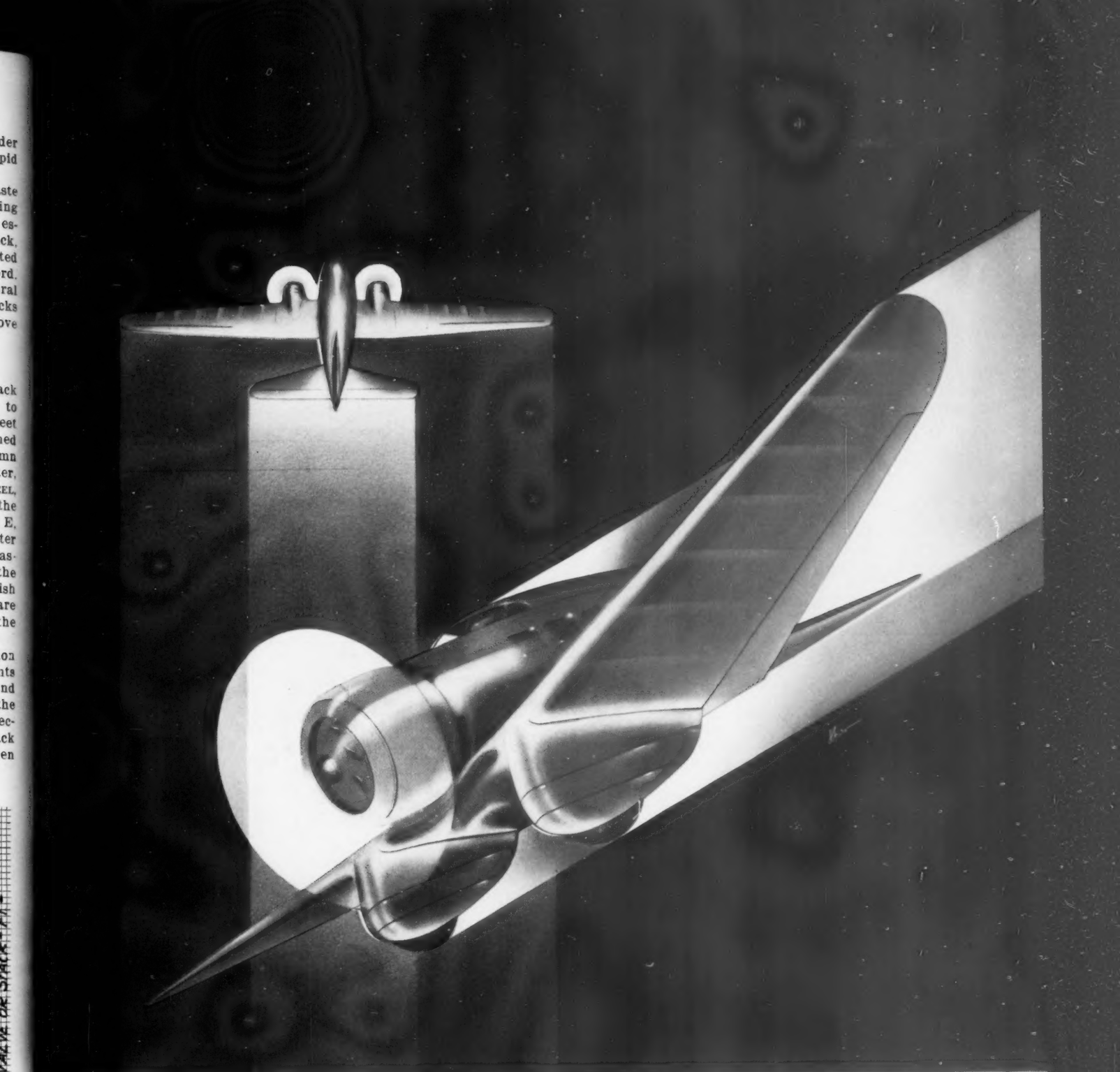

Products of Perfect Combustion - Ft.³/Sec @ 32° Relative Volume - Ft.³/Sec @ Specific Temperature
Excess Air
Producer & Mixed Gas
Other Fuels
0% Excess Air
Gas Temperature Deg. F.
Velocity Ft./Sec
Products of Combustion + Excess Air Ft.³/Sec @ 32°
Max. Heat Input - B.t.u./Sec.
Required Area - Flue, Valve or Stack - Ft.²
Steel Produced - Tons Ingots / Hour

Fig. 185—Chart for solving flue, valve or stack areas



Motors that master the air are made more dependable with NICKEL

The fact that Nickel Alloys are almost universally used by the aviation engine industry, may be considered a guide to their value in all machinery subjected to hard service.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL ST., NEW YORK, N. Y.

...and metals that conquer the air are tough enough to serve on land

NICKEL ALLOY STEELS

The superior mechanical properties of Nickel Alloy Steels make them the ideal material for gears, pinions, shafts, roller bearings, valves, tool bodies, die blocks and miscellaneous forgings and castings subject to heavy duty in operation.

NICKEL CAST IRONS

(including NI-HARD and NI-RESIST)

Among the many types of Nickel Iron castings that are used today with success and economy are: Internal combustion cylinder blocks, locomotive cylinders, pressure castings, machine tool beds and frames, pump bodies, compressor parts, steel mill rolls, grinding, crushing and sizing equipment, etc.

NICKEL ALUMINUM ALLOYS, BRASSES and BRONZES

Nickel Aluminum Alloys are used for automotive, diesel and aviation engine pistons and cylinder heads and for aeroplane propeller blades. Nickel brasses and bronzes are used for worm gears; pressure castings, seats, valves, fittings, sleeves, bushings and bearings.

FREE

Send for our handy celluloid vest pocket size "Hardness Conversion Table." Quickly gives approximate relation between Brinell, Rockwell and Shore hardness values and corresponding strengths of Nickel Alloy Steels. Address Dept. A1.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York, N. Y.

The velocity of the furnace gases when passing through the waste heat boiler flues has no particular significance since the movement is caused by the effect of the induced draft fan. However, a low velocity in this flue is likely to cause a better distribution of the gases when they reach the riser flue and boiler.

Through the use of the chart, Fig. 185, the area of flues, valves and stacks to properly fit any conditions may be found easily. The various sections of the chart introduce all of the factors that enter into the solution of such problems. The solution is started by entering the chart at the scale at the lower left border steel produced, tons ingots per hour, which is the base from which all furnace design should originate. A vertical line from the appropriate value intersects the designated line of fuel practice, B.t.u. per ton. A horizontal line to the extreme left border indicates the maximum heat input at the furnace, thousands of B.t.u. per second. In order that provision may be made for the peaks of operation, this and all subsequent values of volume or area are shown as one and one-half times the average operating rate.

Recommends Greater Thickness

The horizontal line intersects, or is extended to the right to intersect the line of the specified fuel. From this point a line is erected to the appropriate curve of excess air, which extended to the upper left scale, indicates the volume of the products of perfect combustion as at 32°. The zero line is common to all fuels while the full lines of excess air are to be used in connection with producer or mixed gas operation, and the dotted lines for the other fuels. A horizontal line from the intersection of the selected line of the combustion condition is now extended to the line of the appropriate temperature. This line passes through an intermediate vertical scale that gives the sum of the volumes of the products of perfect combustion and the excess air, as at 32 degrees Fahr. A vertical line from the temperature point to the selected velocity then is extended horizontally to the scale at the extreme right border at which the area in square feet is found appropriate to the flue, valve or stack being considered.

Two examples are indicated for the proposed furnaces as follows: 13.9 tons per hour, 5 million B.t.u. fuel practice, producer gas fuel, 40 per cent excess air, 1350 degrees Fahr. gas temperature, 20 feet per second velocity which gives the flue area as 52.5 square feet. The example for the second condition is. production 14.75 tons per hour, 4 million B.t.u. fuel practice, oil fired, 20 per cent excess air, 1100 degrees gas temperature, 15 feet per second velocity which develops a flue area of 33.8 square feet as required.

The refractory design of the flues is simple and usually follows a single general scheme. The approved flue construction is illustrated, Fig. 186.

In flue construction the restraint of horizontal roof thrust is difficult and requires costly construction. Accordingly, the semicircular roof, which when loaded does not develop horizontal thrust (see Table XCVIII), invariably should be used. Flues may be required to support considerable superimposed loadings, which possibly may be those of trucks of loaded railway cars. The correctly installed semicircular roof will support even such loadings.

For increased strength and better valve inclusion it is well to design the flues to relatively great depth and less width. Thus (from Fig. 183) a flue with 50 square feet area should be 6 feet wide by 9 feet high rather than 8 feet wide by 7 feet high.

The principal refractory of the entire flue system should be second-grade fire brick. The flues to the stack should be insulated in order to prevent undue heating of the cellar and to assure that maximum heat will reach the waste-heat boiler, or if a boiler is not included, to produce the maximum fluid temperature in the stack in order that the greatest draft will be created. If not insulated and sewers, water lines, etc. are adjacent to the flues, the loss of heat may be considerable and interfere with draft conditions.

The sides and roofs of the flues should be encased with common brick, laid in cement mortar to assure tightness from ground or surface water. Each flue should be built on a hollow foundation to allow free cross-drainage.

By Trautwine's formula the 9-inch deep, 180-degree roof will be stable only if the span be less than 4 feet 9 inches, while the 13½ inch deep roof will be stable at roof spans of 10 or 12 feet (see Fig. 187).

Indicates Products of Combustion

Accordingly, while the 9-inch thick roof may be used with narrow flues, it will probably be best to generally include the 13½-inch roof with side walls of like thickness and the other details as illustrated in Fig. 186.

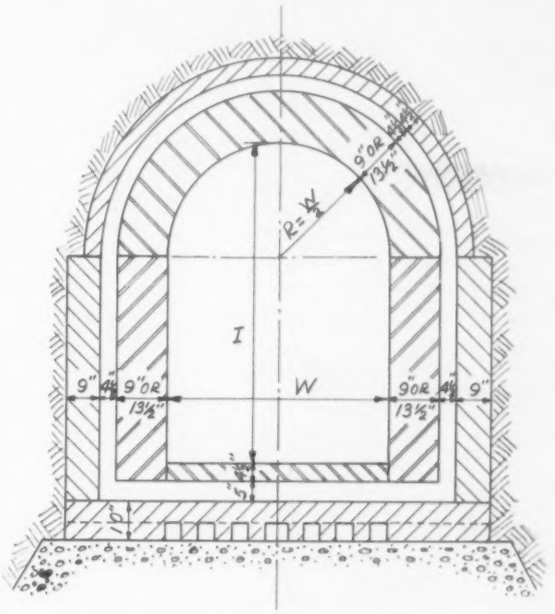


Fig. 186—Cross section through flue of recommended construction

Unless sewers or water pipes are adjacent to the flues, in which case the heat loss to them may be considerable, the principal source of heat loss in the flues will be the water cooling arrangements of the valves. While the temperature loss is nominal through the slide type valve, 25 to 50 degrees, the loss has been reported from several sources as 200 degrees or more when the above ground type of valve is included, and more than 100 degrees of temperature loss is always to be expected.

Hot Surface Affects Resistance

The combined thermal resistance, R, of the flue construction illustrated is above 5.0 or the greatest of the entire furnace system. This is not due to excessive refractory and insulation thickness which in the case of flues is necessary to a stable structure, but to the relatively low temperature of the hotter refractory surface.

In addition to the thermal resistance of the refractory the ground surrounding the flues, if dry is a good insulation and thus if there are

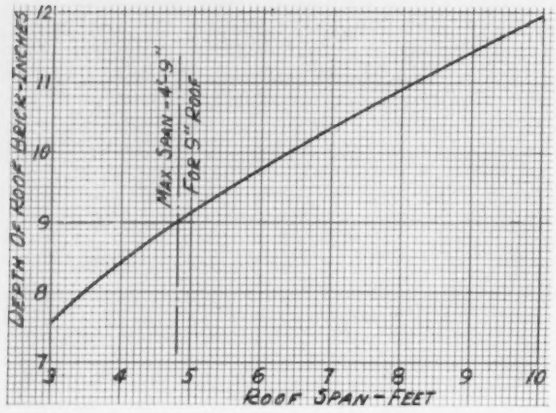


Fig. 187—Solution of Trautwine's equation for 180-degree flue roofs

no unusual below ground sources of heat loss, all loss of heat must be by radiation and convection through the cellar floor.

In the design of the flues care should be taken to secure the maximum of tightness particularly about the valve settings and at manholes. Sand sealed manhole covers to insure tightness should be used. In order to allow convenient inspection and easy cleaning, a manhole should be included in each flue.

Lined with Firebrick

The stack of an open-hearth furnace is an important ancillary of the system. As shown in Table CXXXVIII, column z, the diameter inside of the lining will be 6 feet or more and the height will be greater than 150 feet. On account of the temperatures of the voiding furnace gases, all open-hearth stacks are lined to the top with firebrick.

With but a single exception all typical open-hearth stacks are of steel. The exception is at the plant containing furnace E at which the stacks are of radial brick, firebrick lined.

All of the steel stacks of the larger furnaces at least are of the self-supporting type. As an example of the material required in the construction of this type of stack the 7 foot diameter by 200 feet high stack of furnace L required 5600 9-inch equivalent firebrick, 55 tons of plate and other rolled steel, and 5 tons of cast iron, the cost of the material in place and labor being about $13,500.

Stack Upkeep Is Low

The brick stacks previously mentioned have given excellent service for ten years and have required no upkeep such as painting.

Although the bases require more ground area than do self-supporting steel stacks of similar interior diameter and height, and greater foundations, the brick stack of open-hearth dimensions is usually less costly than the steel stack. Besides the advantage of cost, on account of the insulating value of the red brick exterior, the furnace gases will be at a higher average temperature and thus will develop a greater draft.

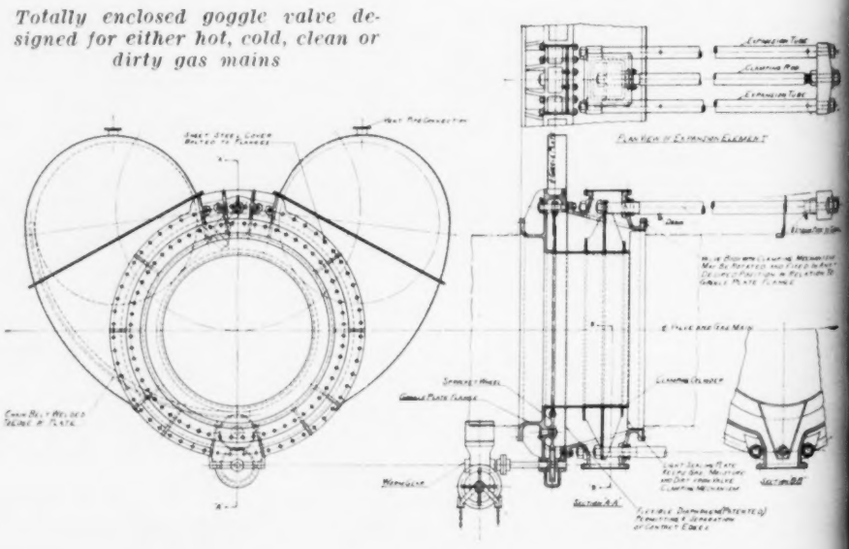
(To be continued)

Designs Goggle Valve for Gas Main Service

A fully enclosed goggle valve built with a monocle plate has been developed. The monocle plate when between the contact edges is in the closed position; when swung out to one side it is in the open position leaving a gap of ¾ to 1 inch between the two contact edges and allowing the full gas pressure in the plate housing.

The operating mechanism is on the exterior of the gas stream and thus is protected against dirt and moisture. The interior of the valve is free from any obstructions that would impede the flow of gas or collect dirt. The movement developed by expanding or contracting of the thermal expansion tubes is applied directly to the clamping cylinder thereby eliminating the intermediate power levers and pins. The clamping cylinder is welded to the flexible diaphragm plate inside the valve castings thus making it unnecessary to move the gas main to separate the contact edges. The new thermal expansion valve shown in the accompanying illustration, was designed by William M. Bailey Co., Pittsburgh.

Totally enclosed goggle valve designed for either hot, cold, clean or dirty gas mains



College Broadens Scope of Its Extension Publication

For the past 15 years the department of engineering extension, Pennsylvania State college, State College, Pa., has published the *Engineering Extension News* during the college year to report on its activities. With the November issue, the name of publication will be changed to the *Pennsylvania State College Extension News* and its scope enlarged to cover news of the manifold extension activities of the college in many fields.

The new publication will be edited by the department of public information in co-operation with the extension services.

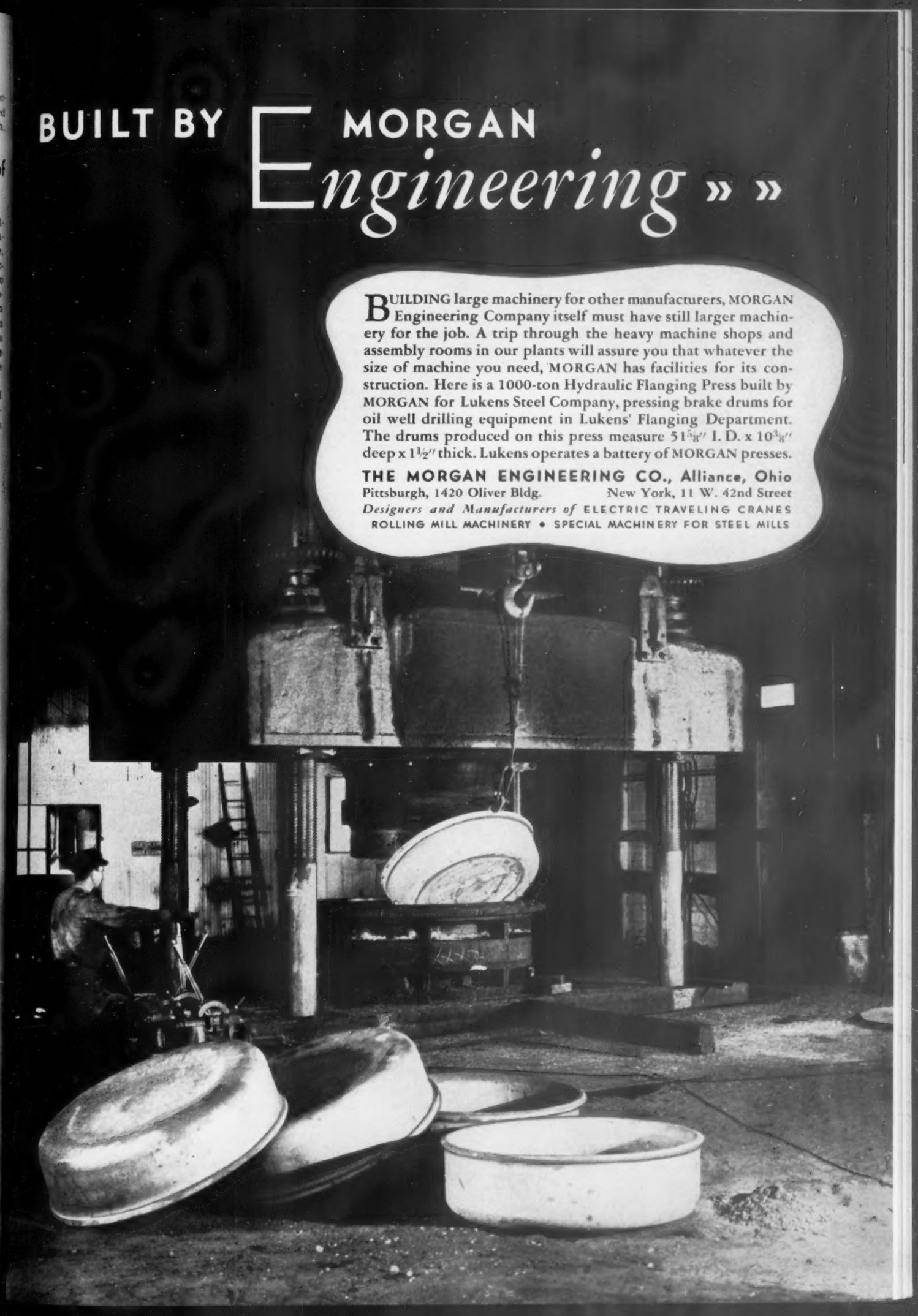
Forum on Modernization

(Concluded from Page 54)

with the old tools for a spell." Yes, they can get along, but an honest look at the cost of it would make a strong man gasp for breath.

Bankers are going to investigate the profitmaking capacity of plants much more carefully than they have in the past. A canvass of the present situation would no doubt show that banks throughout the land have funds tied up in plants which are full of old equipment. Had those same banks investigated the conditions behind the financial statement, and determined that those plants had little profitmaking capacity because of that old equipment, it is safe to say that loans would not have been made so easily.

Wise men tell us that good business is ahead. Let those who would profit by this business also be wise, and get the most out of it by the use of modern equipment.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Metallurgists Report Results Of Laboratory Researches

A NUMBER of miscellaneous subjects, including aging of steel, endurance of case hardened gears, pickle pitting by electrolytic potentials and damping capacity in fatigue, were discussed at two research sessions conducted by the American Society for Metals on Oct. 3 in Chicago during the society's annual convention.

Two papers were devoted to the aging of steel. One of these contributed by E. S. Davenport, research laboratory, and E. C. Bain, assistant to vice president, United States Steel Corp., New York, dealt first with the moderate increase in hardness which develops gradually in annealed low carbon steel at temperatures as low as room temperature following a rapid cooling from temperatures near 1300 degrees Fahr. This was explained on the basis of precipitation of iron carbide from ferrite supersaturated with respect to carbon, a reaction which conforms in type with those in familiar age-hardening alloys.

More extended studies were reported on the aging phenomena observed at temperatures from zero Cent. upward in cold worked low carbon steel. Observations from many sources were considered, which indicated that strain aging, blue brittleness, Fry etching figures and other behaviors are all due to the precipitation, particularly upon slip bands, of a compound, probably an oxide, from ferrite supersaturated with respect of oxygen. This precipitation reaction shows some seemingly unique features.

Two Types of Precipitation

The authors were led to the conclusion that the various aging effects in low carbon steel result from precipitation phenomena of two general types:

(A) Carbon aging. In annealed steel, iron carbide is precipitated from ferrite, supersaturated with respect to carbon, in a random manner throughout the grains.

(B) Strain aging. Ferrite seemingly supersaturated with oxygen, rejects an iron-oxygen compound in the slip bands of cold-worked grains and is thereby hardened.

In discussion, Dr. R. N. Arnold, University of Illinois, Urbana, Ill., stated he had conducted extensive research on the aging of low carbon steel which follows rapid cooling from high temperatures. The study of this particular type of aging, however, appears incomplete without an investigation of the changes in impact properties with which it is accompanied. Dr. Arnold suggested that had Messrs. Davenport and Bain been in possession of such impact data they might have been in a position to put forward a more detailed explanation of the possible causes of aging in low carbon steel.

Samuel Epstein, metallurgist, Battelle Memorial institute, Columbus, O., commented on the conclusion of Messrs. Davenport and Bain that in ordinary commercial iron and steel quench aging is primarily due to carbon and strain aging is primarily due to oxygen. This makes a helpful generalization, said Mr. Epstein, but in some respects the simplification has been carried too far. It is doubtful, he contended, that a very sharp line of demarcation can be drawn between quench aging and strain aging. The two are more probably interrelated.

INVESTIGATION of the influence of deoxidation on the aging of mild steels was reported in a paper by B. N. Daniloff and R. F. Mehl, department of metallurgy, Carnegie Institute of Technology, Pittsburgh, and C. H. Herty Jr., metallurgical engineer, Bethlehem Steel Co., Bethlehem, Pa. A series of steels, varying in carbon content between 0.02 and 0.25 per cent, and representing a wide variation in the degree of deoxidation, was tested for aging after quenching from subcritical temperatures and after cold working.

According to the deoxidation treatment, the steels were divided into four major classes: (1) Rimmed steels; (2) semikilled steels; (3) silicon-killed steels; and (4) aluminum-killed steels. Deoxidation has a very pronounced effect on the over-strain and the quench aging of mild steel. Generally, the more thorough the deoxidation, the less marked is the tendency to age. Normalized rimmed steels are highly susceptible to quench aging, the maximum effect being reached in steels containing 0.04 to 0.05 per cent carbon. In the semikilled steels the aging is considerably less than in the rimmed steels and the aging effect shows the same general tendency to diminish with increasing carbon content. Silicon-killed steels quench age considerably, but only about half as much as the rimmed steels.

Steels killed with aluminum quench age very little, the degree decreasing with increasing carbon content. In the carbon range of from 0.2 to 0.25 per cent they become practically free from quench aging. Rimmed, semikilled and silicon-killed steels are very susceptible to over-strain aging even in the higher carbon range. Aluminum-killed steels strain age considerably less, the embrittling effect of the strain aging treatment decreasing with the degree of deoxidation.

In the as-rolled condition, all steels are susceptible to over-strain aging. However, the strain aged SMA steels possess a better impact resistance than the other aluminum-killed and semikilled steels investigated. The change in hardness with rising temperatures of quenching (300 to 715 degrees Cent.) was determined and correlated to the degree of aging after quenching. The degree of hardening of normalized steels upon quenching from subcritical temperatures decreases with increasing carbon content and with the degree of deoxidatiton, indicating that both carbon and oxygen are factors determining the degree of supersaturation of the ferrite and consequently the aging properties of steel.

In view of considerable variations in grain size with the method of deoxidation, the authors made a brief study of the influence of grain size variations on the aging characteristics of steel. Fine grain size resulting from deoxidation with aluminum is partly responsible for the comparative immunity of aluminum-killed steels to aging.

Aged at Elevated Temperatures

It is possible that highly dispersed particles in the aluminum treated steels may contribute to their nonaging properties through decreasing the rate of carbon diffusion in ferrite. The effect of time and temperature on the aging characteristics of several steels was studied by means of aging tests carried out at elevated temperatures (20 to 300 degrees Cent.). Using these data an attempt was made to demonstrate the independent precipitation of oxides.

In concluding, the authors stated that deoxidation decreases the tendency of mild steel to age (1) because it lowers the dissolved oxygen content of the steel, (2) through the formation of finely divided particles of deoxidation products it refines the grain size, and (3) possibly reduces the rate of carbon diffusion in ferrite.

W. P. Sykes, metallurgist in the Cleveland wire works of General Electric Co., Cleveland, presented a paper which constituted notes on the solidus temperatures in the systems iron-tungsten and iron-molybdenum. By observations on the melting temperatures of wire specimens the solidus lines in the iron-rich portions of the two binary systems were lo-

cated with seemingly increased precision.

ENDURANCE of case hardened gears was discussed in a paper by O. W. McMullan, metallurgist, International Nickel Co. Inc., Bayonne, N. J. This paper described results of dynamometer breakdown tests of rear axle drive gears and pinions. Tests were made on oil hardened and several case hardened steels and the results were compared with physical properties on laboratory test specimens.

It was found by Mr. McMullan that some of the higher alloy gear steels when carburized and double treated had the highest load carrying capacities. Those results were confirmed in the endurance tests, but it was also found that other factors than strength and hardness as treated may greatly influence life. Operation of a ring gear and pinion is such that the gear is constantly running in oil and hence is well lubricated and cooled. The pinion is not so well lubricated and cooled and its greater number of contacts produce momentary high surface temperatures which cause tempering and softening thus increasing wear, changing of bearing contacts, and lessening fatigue resistance.

Wear Resistance Unsatisfactory

Uncased oil hardened steels such as S.A.E. 4340 have good tooth strength for the gear but do not have wear resistance necessary for long pinion life. Double-treated Krupp steel has excellent strength but is softened at low temperatures and life is short due to pinion failure. Pot quenched 4615 apparently has sufficient austenite in the case to maintain file hardness at high operating temperatures and proved to be much better for pinions than stronger steels such as Krupp. The combination of pinions of pot quenched 4615 and gears of Krupp or 4820 double treated gave long life because of the necessary resistance to softening and wear and of strength where each was needed. The parts were so designed that the pinions of the weaker steel had sufficient strength when softening of the case did not occur.

It is possible, said Mr. McMullan, that better results might have been obtained with some of the steels had different treatments been given them to make them more suitable for pinion service. The results indicate that to obtain maximum life, steels must be selected and heat treated according to the service they must perform when highly stressed.

Contributing a written discussion of Mr. McMullan's paper, C. F. Smart, Pontiac Motor Co., Pontiac, Mich., stated that his company's tests on differential ring gears and pinions agreed in general with those of the author. They found a definite practical difference shown by life tests of gears made from various steels and heat treating methods generally used.

A careful comparison of heat treating practices for carburized gears has indicated clearly, he said, that direct pot quenching of both ring gears and pinions gave considerable improvement over cooling in the carburizing pots, followed by reheating and quenching. Softness of tooth surfaces, whether the result of decarburization through slow cooling in the pots or by tempering after hardening, decreased gear life. Accordingly, direct pot quenching with no subsequent tempering operation was adopted for both ring gears and pinions with highly gratifying results.

Agree on Depth of Case

Mr. Smart agreed with the author that case depth for maximum life must not fall below approximately 0.040-inch. Tests run for determining the effect of case depth showed beyond doubt that tooth failures occurred earlier with a thin case.

Every example of differential ring gear or pinion tooth failure which has come to the attention of Pontiac engineers indicated clearly by the nature of the fracture that failure was by fatigue, never by impact. Assuming proper tooth contact in the original gear setting and assuming adequate rigidity of supporting members, then the relative gear life for a given design and intensity of loading is dependent upon (1) inherent strength of the gear tooth, both case and core; and (2) resistance to change of tooth contact by wear, scoring or pitting. Proper tooth contact is vital to good gear life, and undoubtedly many tooth failures, noisy gears and scored gears have been due to laxness in this regard.

For these reasons, those elements of gear steels and gear practice which affect machining, distortion in heat treatment, case depth and hardness, and core structure and strength, must all be given due consideration. Pontiac engineers have differed from Mr. McMullan's practice in regard to preferred grain size of gear steel, their preference being for a medium grain rather than a fine grained steel. This is because the fine grained steels require considerably higher annealing temperature to produce a structure satisfactory for machining, and because it is felt that the medium grained steels respond better in carburizing and hardening treatments.

It was the belief of Mr. Smart, based on carefully conducted comparative tests, that there is considerable difference in the life of gears made from some of the commonly used alloy carburizing steels. Comparative tests on S.A.E. 3115, 2315 and 4615 steels proved the hardened case of 3115 to offer greatest resistance to wear and pitting and this factor is believed to be responsible for the improvement in fatigue life.

In endurance runs of gears, failure generally ensues from fatigue cracks which usually originate at the base of the teeth, said E. F. Davis, metallurgist, Warner Gear Co., Muncie, Ind., in a written discussion. Generally a deep etch will reveal most of the teeth have fatigue cracks of varying depths but which have not progressed as far as those which have actually failed.

Wear almost invariably occurs first. Unless the metal is actually defective, the tooth surfaces show considerable erosion near the pitch line before any teeth break. Fatiguing always seems to follow the destruction of the true involute pathway of the rolling gears and the life of the dynamometer run is in proportion to maintenance of correct tooth form. Mechanical errors likewise affect the endurance of a dynamometer run.

Teeth of Maximum Hardness

Assuming mechanical errors are at a minimum and nearly true rolling action is maintained, then the only factor is preservation of surfaces hard enough to maintain the true involute, continued Mr. Davis. The excellent service of direct cyanided gears when steels are used having cores testing over 400 brinell and therefore brittle indicates the importance of presenting the hardest possible surface on the gear teeth.

Carburizing is the synthetic production of a tool steel case of varying carbon content ranging from 1.35 down to approximately 0.50 per cent carbon, being highest, of course, on the outer layers and gradient. In this carburized case are liable to be outer layers extremely brittle with a tendency to spall or crack and with different physical properties and response to heat treatment through the carburized area. The extreme outer layers of certain alloy steels carburized and hardened are liable to contain considerable austenite. Mr. Davis has observed ring gears which scored very quickly due to an austenitic skin.

Another phenomenon which sometimes occurs when gears are carburized deeply is exhaustion of the carburizing gases and an unbalanced C, CO and CO_2 reaction toward the end of the operation whereby the carburizing gases react with the

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carbon deposited in the steel and this decarburized surface ultimately reduces the wearing qualities. This could likewise occur when light case work is carburized if the carburizer were weak or the sealing of the box improperly done, but the hazards always are greater when carburizing time is prolonged. Slightly decarburized surfaces develop fatigue cracks and are quickly overloaded.

In concluding, Mr. Davis said we are concerned solely with preservation of outer surface for long endurance runs. Since tooth wear develops before fatigue failure, we should investigate carefully the area close to the surface as the most important cause of Mr. McMullan's result.

A third written discussion was contributed by A. L. Boegehold, metallurgist, research division, General Motors Corp., Detroit, in which he pointed to the author's conclusion that the results of laboratory tests, showing load carrying capacities on some of the higher alloy gear steels carburized and double treated, were confirmed in rear axle endurance tests. It would appear, contended Mr. Boegehold, that any correlation observed between laboratory flexural tests and rear axle tests were purely accidental.

Must Limit Distortion

There are several factors operating in a rear axle test, not present in a laboratory test, which prevent an ordinary flexural test from being an indication of durability of material in rear axle gears. One of the most important considerations in selecting a gear steel, according to Mr. Boegehold, is that it shall permit heat treating with a minimum distortion so that tooth stress will not be greatly increased by a bad tooth contact with the mating gear.

PICKLE pitting by electrolytic potentials as affected by scaling temperature was the subject of a paper presented by C. H. McCollam and D. L. Warrick, Timken Steel & Tube Co., Canton, O. According to the authors, pickling of alloy steels is accompanied by certain difficulties, aggravated by time and temperature, particularly after certain heat treating operations. Over pickling does not give much trouble now, but pickle pitting occasionally does. Typical examples of pickle pitting are shown in the accompanying illustrations.

Study of certain pearlitic alloy steels, pickled after annealing showed pitted areas of varying sizes and depths, an inverse ratio apparently existing between the size of area and the depth of pitting. The boundary of the pitted area was frequently marked by a deep, narrow line of demarcation, indicating electrolytic action. Research confirmed this theory.

S.A.E. steels 4615 and 52100, together with a carbon molybdenum steel were selected by the authors for test because of their diversity of composition and wide use in the automotive and other industries where surface finish and size are important considerations. Pickling was done in both sulphuric and sludge acid solutions, acid concentration being 7.6 per cent.

Potentials of the scaled and steel samples were determined separately against a normal calomel half cell as a reference electrode and the electrical potential calculated by algebraic difference. Values were recorded at 1-minute intervals during the first 5 minutes of immersion.

Observations Are Recorded

In the case of samples tested, a temperature interval exists through which the difference in potential between the scale and the clean metal shows an abrupt rise. This rise does not occur at exactly the same temperature for all steels. Above 1500 degrees Fahr. a potential difference of approximately 0.6 volt exists. Close proximity of the transition temperatures to the A_c points of the steels investigated also is noted.

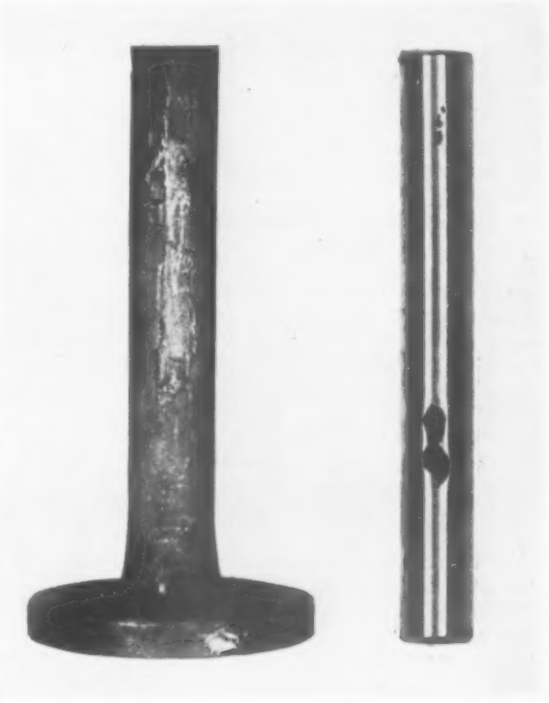
Results obtained by the authors indicate that pickle pitting frequently is caused by an electrolytic couple, set up between scale-free areas and scale formed above a certain temperature. When scale is formed below the transition temperature, neither the difference in electrical potential nor the depth of pitting from this same cause are significant. When this temperature is exceeded, the difference in potential results in a galvanic action between the scale and metal, which proceeds at the expense of the cleaned metal surface. The magnitude of the resulting pit is a function of time and current density.

Mechanical scale breaking, whereby large areas of clean metal are exposed to the electrolyte will reduce the current density and thereby decrease the intensity of action, stated Mr. McCollam and Mr. Warrick. A pickling inhibitor does not satisfactorily dampen the electrolytic action that is responsible for pickle pitting. After the scale has been removed, the inhibitory effect begins to assert itself, but it is apparent that even then there is a slow preferential attack of the pitted areas, probably due to the roughened surface of the pit.

DAMPING capacity as a factor in fatigue was discussed in a paper presented by G. R. Brophy, metallurgist, research laboratory, General Electric Co., Schenectady, N. Y. The author determined the damping characteristics and endurance properties of several steels in several conditions of heat treatment and made an attempt to correlate these properties.

Studies Grain Size and Structure

Mr. Brophy concluded that damping capacity seems to be related to the damage resulting to steel from overstress and notches. High damping steels are resistant to sharp notches, but not to overstress, while low damping steels are resistant to overstress, but sensitive to notches. A limiting damping capacity, varing, it is believed, for different notches is recognized. Below this limit, extreme notch sensitivity occurs. Several factors influencing these proper-



ILLUSTRATED here are typical examples of pickle pitting. The illustration at the left shows pitting on a forged and normalized axle shaft; the one at right shows pits in centerless ground stock

ties were studied by the author and among the most important were grain size and structure.

Submitting a written discussion of Mr. Brophy's paper, H. F. Moore, research professor of engineering materials, University of Illinois, Urbana, Ill., stated that the apparent effect of increasing damping capacity as grain size increases may perhaps be explained by the relatively large amount of hysteresis developed in an overstressed large grain, and by the relatively small area of boundary material between grains in large grain metal, with a consequent loss of resistance to spread of plastic action from one grain to another.

May Suggest Further Rsearch

It is to be hoped, he said, that this paper with its valuable results will stir up a number of experimenters to follow the lines of work Mr. Brophy has suggested. Perhaps this may be the line of attack which will answer that very puzzling question, "When and under what conditions do cycles of repeated stress cease strengthening metal by cold work and begin to weaken it by a spreading crack?"

T. McLean Jasper, Milwaukee, commented that the correlation between damping effect and fundamental endurance limits is going to be difficult, because at the endurance limits of steels the elastic limits are very rarely exceeded. When they are exceeded, such elastic limits are relatively very low as compared to the ultimate strength.

Mr. McLean continued that if he had interpreted the meaning of Mr. Brophy's paper correctly, it was his opinion that the damping capacity probably allows a steel to be selected which is to a greater or lesser degree sensitive to notch effect. The fundamental endurance of steels in the absence of stress raisers is fairly well correlated to tensile strength. The notch sensitivity of such steels, however, may be measured by endurance tests with notched specimens when properly correlated with the fundamental endurance limits, or possibly by a proper interpretation of "damping capacity."

It is believed, he concluded, that repeated stress tests on notched specimens is the nearest approach to the service requirements for certain parts of machinery which a testing laboratory can furnish. Such tests to select the most appropriate steels for designs are tedious to perform, and if some more rapid method can be devised, let us at least use it to eliminate the most undesirable steels. The close selection as between a few steels can be carried out by the more tedious test methods. The final selection will always be left to the service record of equipment.

Investigate Problems Which Arise in High-Temperature Uses of Metals

PROBLEMS encountered with high-temperature applications of metals was the topic discussed at a session of the American Society for Meals held Tuesday afternoon, Oct. 1, in Chicago, during the annual convention of the society. Three papers on the subject were read and discussed.

Physical properties of metals as affected by conditions of ammonia synthesis were reported in a paper prepared by Dr. H. L. Maxwell, metallurgist, engineering department, E. I. du Pont de Nemours & Co. Inc., Wilmington, Del. Chemical processes developed during the last 10 to 15 years have required new and improved materials to withstand the conditions of temperature and pressure. This applies particularly in hydrogenation and synthesis processes.

Problems to be considered in selection of materials for such applications as high pressure, hydrogenation and synthesis ammonia are tensile strength, ductility and shock resistance to hydrogen attack and creep under long continued high stresses.

Work which the author reported in the paper was undertaken to gain further information on metals having desired properties required for these operations. Results showed that deoxidized copper and copper alloys are more resistant to high temperature, high pressure hydrogen-nitrogen mixtures than similar alloys containing oxide. Plain carbon steel and also low chrome-nickel alloys are severely embrittled at temperatures up to 500 degrees Cent. in contact with 3.1 hydrogen-nitrogen mixtures at 1000 atmospheres pressure. Chrome-tungsten, chrome - molybdenum and chrome-vanadium steels show increased resistance to gas attack under these same conditions for intervals up to 1535 hours.

Influence of carbon content on high-temperature properties of steels was reported in a paper by Dr. A. E. White and C. L. Clark, department of engineering research, University of Michigan, Ann Arbor, Mich., and R. L. Wilson, metallurgical engineer, Timken Steel & Tube Co., Canton, O Two steels were investigated; one was of plain carbon type and the other a low alloy steel containing silicon, chromium and molybdenum. In each case two carbon contents were considered with the lower carbon steels containing about 0.10 per cent and the higher, 0.45 per cent.

Comparisons made by the authors were based on the short-time tensile, creep and impact characteristics at temperatures ranging from 85 to 1400 degrees Fahr. The relative high temperature stability of the steels was also investigated by submitting specimens after creep testing to metallographic examination and to tensile and impact tests at room temperature.

Results indicated that the behavior of steels at elevated temperatures is sometimes independent of the carbon content and may be affected by initial heat treatments or the addition of alloying elements that would change the character of the carbides in the structure.

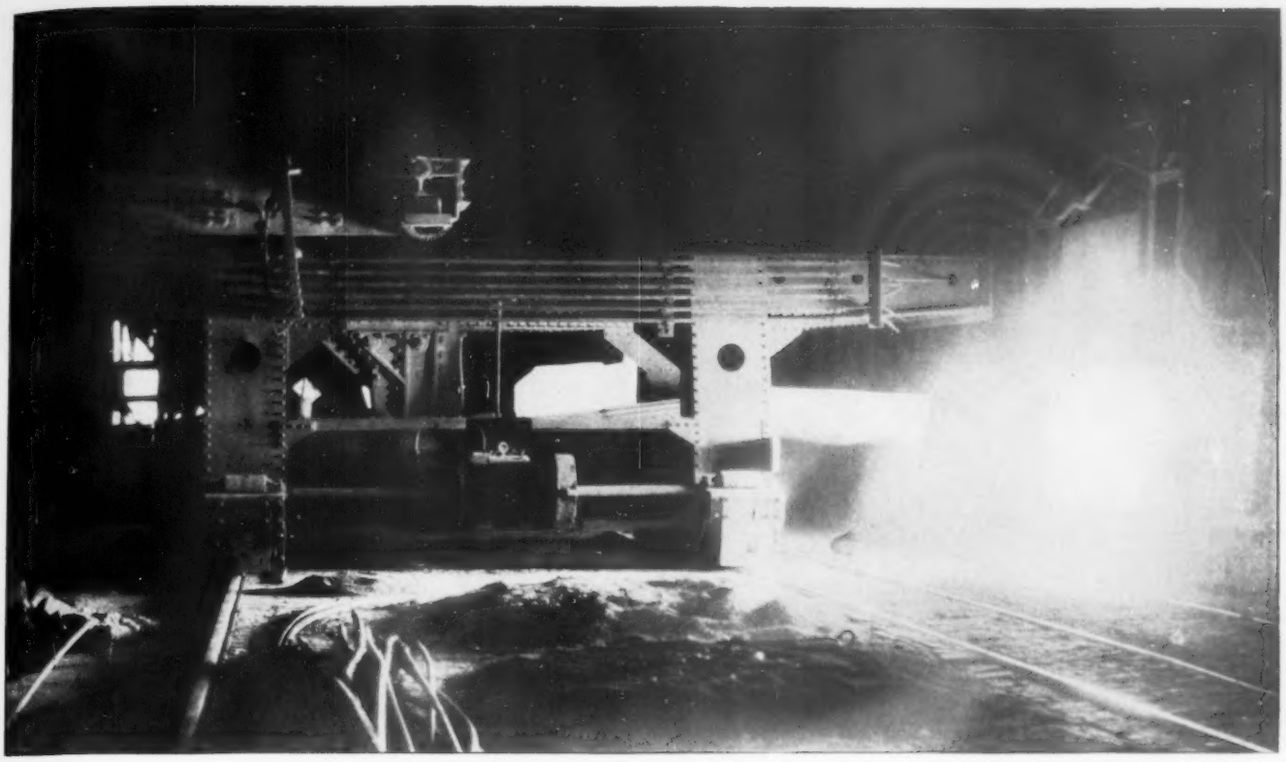
A new heat-resistant alloy, known as Smith Alloy No. 10, was described in a paper by Dr. S. L. Hoyt, director of metallurgical research, and M. A. Scheil, research metallurgist, A. O. Smith Corp., Milwaukee. The new alloy is of the iron-chromium-aluminum type, containing 37.5 per cent chromium and 7.5 per cent aluminum. It is melted in the high-frequency furnace, and its ingots are rolled to rod or ribbon, or swaged to wire for use in electric furnace resistor elements.

Increases Resistor Life

On life test and in furnace operation, the alloy was shown to have many times the useful life of the standard nickel-chromium alloy. The temperature range for operating the metallic resistor type of electric furnace has thereby been raised to 2300-2400 degrees Fahr. The paper presented details of life testing, properties and behavior.

Fred P. Peters, chemist, Wilbur B. Driver Co., Newark, N. J., in a written discussion, stated it was unfortunate the authors did not effect a comparison of No. 10 alloy with materials engineered and marketed for service in a similar temperature range, that is 2100-2600 degrees Fahr., rather than nickel-chromium. Admittedly, nickel-chromium is the standard resistor material, but it is not at all standard for service at temperatures in excess of 2100 degrees

(Please turn to Page 78)



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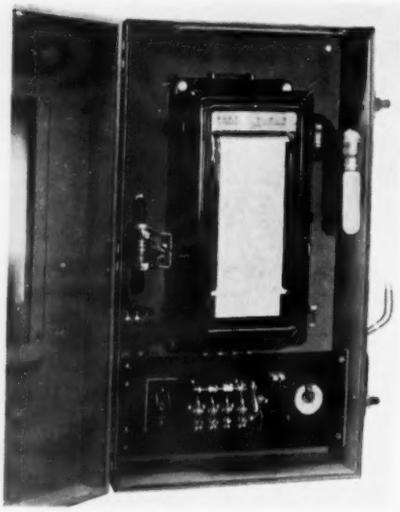
NEW EQUIPMENT

Steel Temperature Recorder—

Bacharach Industrial Instrument Co., 7000 Bennett street, Pittsburgh, is bringing out a new instrument known as the "Velarmeter" which will measure the temperature of the steel being rolled and also will record the temperature graphically on a chart moved according to time. In this manner, the mill superintendent is provided with a production as well as a temperature record of each piece of steel rolled.

The instrument, shown herewith, is entirely automatic. The temperature measuring element is mounted permanently on or near the rolling mill and is connected to the recorder



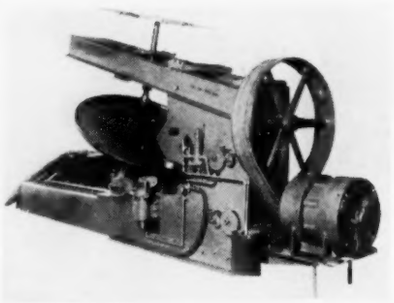
Bacharach Velarmeter, a steel temperature recorder

by a pair of wires. The recorder may be located a distance from the measuring element, at a convenient place. The measuring element is a tiny thermocouple which receives heat from the steel through a lens. The current generated by the thermocouple is measured by a high speed recording galvanometer. One dot is made on the chart showing the temperature of each piece of steel.

♦ ♦ ♦

Flanging Machine—

Blue Valley Machine & Mfg. Co., Kansas City, Mo., recently brought out a new type of high-speed flanging machine for flanging boilers and tank heads, either flat, bilged, concave or round. Built in six sizes, these units range in length from 10 to 16 feet, in width from 18 inches to 5 feet, and in height from 5 to 6 feet. Capacity of the machines is from 30 gage thickness, 12-inch diameter to ⅝-inch thickness and 20 feet diameter. The six machines are powered with ¾, 1½, 7½, 10 and 15 horsepower "Linc-Weld" motors. All operations are performed through a centralized group of controls, located so that the operator has a clear view of the work.

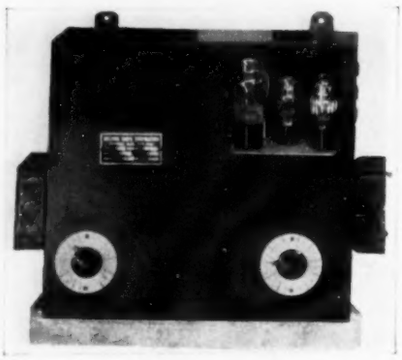


Built by Blue Valley Machine & Mfg. Co., this high-speed flanging machine is capable of making a 2½-inch flange on a 12-foot diameter flat head ¼ inch thick in one minute

♦ ♦ ♦

Welding Timer—

Welding Timer Corp., 251 Ogden street, Newark, N. J., is announcing a new line of electro-mechanical timers for spot welding machines. The device, shown herewith, consists of a timing element and a set of balanced contactors designed to handle the high overloads encountered in spot welding. These Welco timers, as they are known, permit spot welding at times as low as one cycle. Timing accuracy of less than ¼ cycle, plus or minus, is guaranteed at one cycle operation. At slower speeds, for example, between 20 and 30 cycles, any reasonable accuracy can be assured, even up to 2 per cent plus or minus. Timers for longer times may be had on special order.



Welco electro-mechanical timer for spot welding machines

Standard settings cover a range from one cycle minimum to 30 cycles maximum. Dial settings permit infinite variation of times between maximum and minimum. These units are made in standard sizes from 30, 50, 150, 250 and 600 amperes. Although this range covers practically all spot welding requirements, larger sizes can be obtained on special order.

♦ ♦ ♦

Electric Tools—

Rotor Air Tool Co., Cleveland, has brought out a new line of electric tools which includes 4, 6, and 8-inch grinders, 6 and 8-inch buffers, 7 and 9-inch disk sanders, and 6-inch right-angle grinders. The motor is of the welded copper squirrel cage type. Construction allows space for twelve exceptionally large air channels in the casing to afford proper cooling by means of a solid web fan. Magnesium alloy reinforced with ribs is used in the handles and casing to provide high tensile strength with light weight. An entirely new type of handle insulated from the motor, has been developed to provide room for two fuses.

Model G "Hicycle" grinder introduced by Rotor Air Tool Co.

♦ ♦ ♦

Lathe—

Pratt & Whitney Co., Hartford, Conn., recently introduced a new model C lathe, a simplified unit of unusual accuracy, rigidity and embodying conveniently located controls. Each of the two sizes, having nominal 14 and 16-inch swings, is available

8 Important Advantages are offered in this radically new limit switch

Costs only $6.00

CHECK these big advantages of the new G-E limit switch:

1. ***Two separate circuits,*** one normally open and one normally closed, make it suitable for a wide variety of applications.
2. ***Liberal allowance for overtravel*** — its operating arm can safely turn through 72 degrees.
3. ***Easy to adjust***—by means of its worm-gear precision adjustment, you can lock the operating arm in any position around the shaft.
4. ***Clean, trouble-free contacts*** of the cadmium-plated, double-break type — open and close with a sliding action.
5. ***Easy to install*** — requires no mounting bracket, since the operating arm moves in a plane ***parallel*** to the base.
6. ***Strong, die-cast enclosure*** protects the mechanism. Handy conduit connection and removable cover plate are provided.
7. ***Removable contact tips*** that are easy to replace if and when replacement is necessary.
8. ***Easy operation and long life*** are assured by an improved method of lubrication.

There are dozens of jobs that this new, low-priced limit switch can do for you. It supplies a simple and convenient means of interlocking mechanical motion with electric control circuits, for making processes automatic, operating safety devices, etc. Put it to work on your machines and watch it save money.

Our experienced engineering staff will gladly co-operate with you to put G-E limit switches to work profitably on your machines. For complete information, mail the coupon to General Electric, Dept. 6N-201, Schenectady, N. Y.

GENERAL ELECTRIC

This new limit switch is one example of General Electric's constant activity in advancing modern methods to protect men and machines. Soundness in design, manufacture, and application has made General Electric HEADQUARTERS FOR INDUSTRIAL CONTROL.

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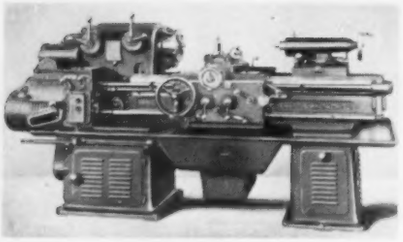
THE RIGHT MOTOR FOR EVERY JOB — THE RIGHT CONTROL FOR EVERY MOTOR



Pratt & Whitney model C lathe of simplified design

in two lengths, giving nominal center-to-center capacities of 30 and 54 inches for each swing. The constant speed driving motor is mounted in a cabinet leg under the headstock which contains gearing that produces 18 spindle speeds ranging in geometric progression from 14 to 1000 revolutions per minute. The new type headstock construction provides a rigid solid support to the driving pulley, and takes the pull of the driving belt. It also does away with excessive overhang at the rear of the headstock.

The spindle of the model C, shown herewith, is heavier and is supported at three points. Power is taken from the headstock through a set of ratio gears to the quick change gear box, the latter providing for 60 quick changes of feed ranging from 0.003 to 0.188 inch. It also provides for 60 quick thread changes from 1 to 60 threads per inch inclusive.

♦ ♦ ♦

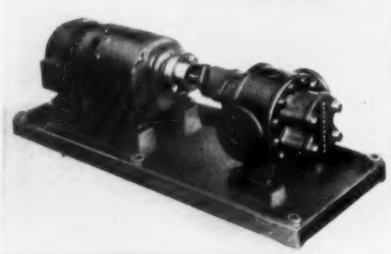
Indoor Bus Supports—

Delta-Star Electric Co., 2400 block, Fulton street, Chicago, has in production an improved line of indoor bus supports with ribbed reinforced high tension clamps. The junction point of reinforcing ribs can, if desired, be drilled and tapped for a spacer insulator to take up a short circuit stresses between busses. These supports are made for use with various size busses and in voltages up to 27 kilovolts.

♦ ♦ ♦

Rotary Pumps—

Worthington Pump & Machinery Corp., Harrison, N. J., is marketing a complete line of standard and steam-jacketed pumps to handle pressure up to 300 pounds per square inch, temperatures up to 650 degrees Fahr., with capacities of from 10 to 2500 gallons per minute. These units, one of which is shown herewith, are designed to handle thick, thin, viscous, hot, cold, corrosive and other liquids including those that solidify when cool, such as asphaltum, rosin, etc. These pumps are claimed to operate quietly, readily handle considerable vapor, air or gas suspended in the liquid, and require practically no attention.



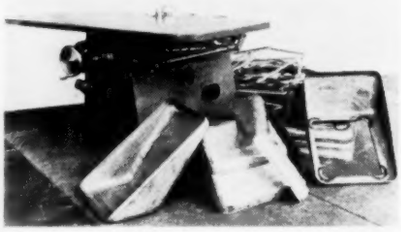
Worthington rotary pump will handle viscous liquids

♦ ♦ ♦

Polishing Lathes—

Hammond Machinery Builders Inc., Kalamazoo, Mich., announces a new line of polishing lathes specially designed for automobile fender polishing and other work of a similar nature requiring a wide swing unit. Shown above, is the model 5RR wide-swing two-spindle, two-motor polishing lathe. Spindles are 107 inches long overall and distance from the side of the base to the inside of the wheels is 30 inches. V-belts can be replaced without removing spindles or disturbing bearings on motors.

Hammond model 5RR wide swing two-spindle polishing lathe

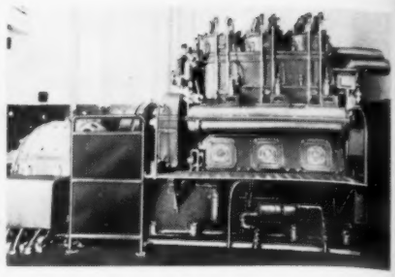


Quickwork machine beads and trims the flash from a stamping in one operation

♦ ♦ ♦

Stamping Trimming Machines

Quickwork Co., St. Marys, O., announces that a further development has been made in its new line of stamping trimming machines whereby it now is possible to bead and trim the flash from a stamping in one operation and at one pass of the stamping. This machine, shown above, does accurate work of this nature on all shapes of stampings which are to be trimmed, beaded and/or flanged in one plane, regardless of whether the shape of the stamping is round or rectangular with round corners. Size also is immaterial.



Type RHB diesel engine designed by Chicago Pneumatic Tool Co.

♦ ♦ ♦

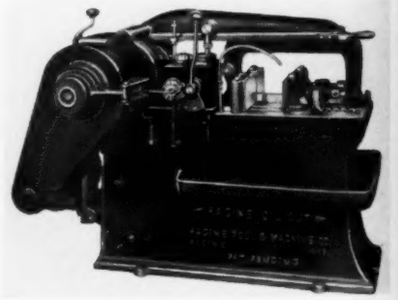
Diesel Engines—

Chicago Pneumatic Tool Co., 6 East Forty-fourth street, New York, is offering a new line of diesel engines designated type RHB. These units, one of which is shown above, are being built in sizes ranging from 100 to 800 horsepower. The Bosch system of direct solid injection is used. Another feature is the design of the cylinder head and component parts, resulting in improved performance. Base and crankshaft are rugged in construction and the entire frame assembly is designed for accessibility. New piston and connecting rod design have resulted in effective balancing. Sensitive control together with pressure lubrication are other important features. The new units have a wide application and are divided into two classifications; one for general use and the other, direct connected for electric service use.

♦ ♦ ♦

Metal Cutting Machine—

Racine Tool & Machine Co., Racine, Wis., has placed on the market a new metal cutting machine employing hydraulic feed and control. Actual capacity of the unit, shown herewith, is 6 x 6-inch square or 6⅝-inch round stock with vise straight, and 4½ x 6⅝-inch with vise set at 45 degrees for angle cutting. A slotted table allows chips and



Racine metal cutting machine employs hydraulic feed

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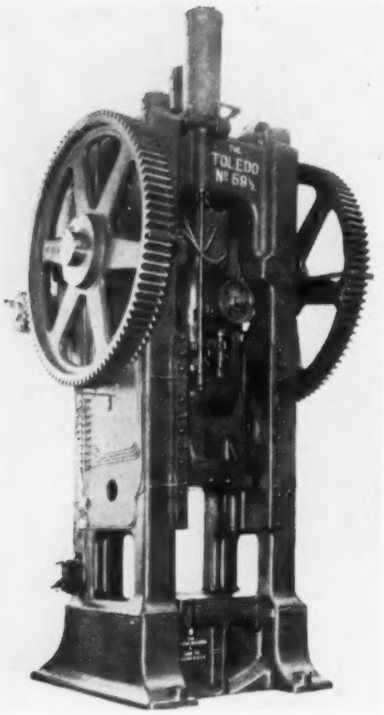


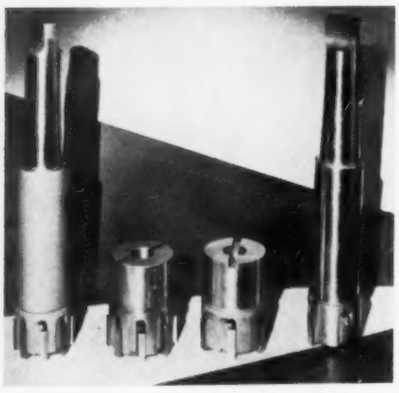
Toledo straight column press has 50 x 43-inch bed area

compound to fall through into chip pan, away from all moving parts. A cutting rate of three to four square inches per minute is claimed in cutting cold rolled steels. The hydraulic feed automatically adjusts itself to pressures built up against the blade, so that in cutting a round bar the feed is increased at the beginning and end of the cut.

• • •

Core Drills and Reamers—

Ingersoll Milling Machine Co., Rockford, Ill., anounces that its zee lock cutter blade now has been applied to multi-blade boring tools. It forms an adjustable and renewable inserted blade core drill or reamer. Cutters may be reground to size by inserting the zee lock cutter blade in the next slot, which moves out the blade only part of a serration, minimizing the amount of grinding. There are eight to thirty-six adjustments or resizings possible with one set of blades. Core drills are made either with shank or of the shell type for use on a separate arbor. Reamers also are made either shank or shell type as shown herewith.

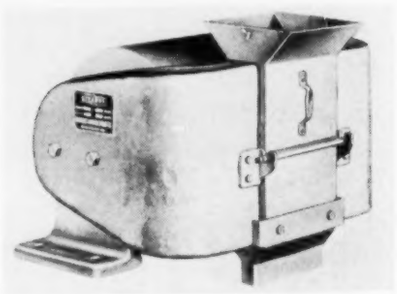


Ingersoll zee lock reamers made in either shank or shell type

• • •

Straight Column Press —

Toledo Machine & Tool Co., Toledo, O., recently brought out a new straight column press, shown in the illustration at left. The crown has been heavily reinforced by making provision to extend the tie rods through the top of the arch. Bed, uprights and slide also have been strengthened. An air type clutch is mounted in the flywheel, with push button control to enable the operator to stop the press at any point of the stroke or to inch the slide. This unit has a 16-inch stroke with a 6-inch adjustment. The slide is 24 x 35 inches and is counterbalanced by two air cylinders shown at the top of the crown.



Type QF magnetic separator developed by Magnetic Mfg. Co.

• • •

Magnetic Separator—

Magnetic Mfg. Co., Milwaukee, is bringing out a type QF magnetic separator for magnetically treating ceramic material in the form of clay slip, porcelain, paint and similar products by the wet process. The unit, shown in the illustration directly above, consists of a powerful stationary magnet energized by coil windings, designed to permit mounting a cartridge or container, consisting of an infinite number of auxiliary magnets of special soft iron material located in the magnetic circuit. Thus the countless numbers of small auxiliary magnets become highly energized by the induced magnetic field, and as the mixed material passes through the same, the fine iron particles encountered are readily attracted and securely held, while the non-magnetic material continues to final discharge. The cartridge or container is made detachable and readily replaceable for cleaning when necessary. If continuous operation is required, an extra cartridge or container of auxiliary magnets can be purchased with the separator.

• • •

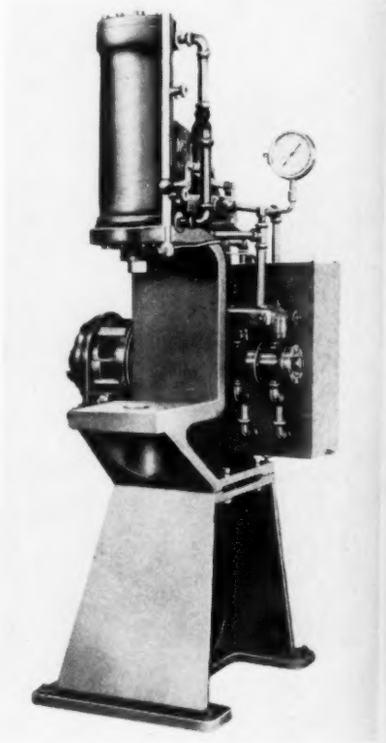
Hydraulic Arbor Press—

Greenerd Arbor Press Co., Nashua, N. H., is announcing a new No. 60 self contained hydraulic press with pressure controls from ½ to 15 tons on the down stroke and from ½ to 13 tons on the up stroke. The unit, shown below, is designed to be employed as a forcing, broaching or plastic molding press. Height over the table is 16 inches. Size of the work table is 12 x 12 inches with 3½-inch cored holed. A greater height over the work table may be had, as well as slower ram travel, if desired.

• • •

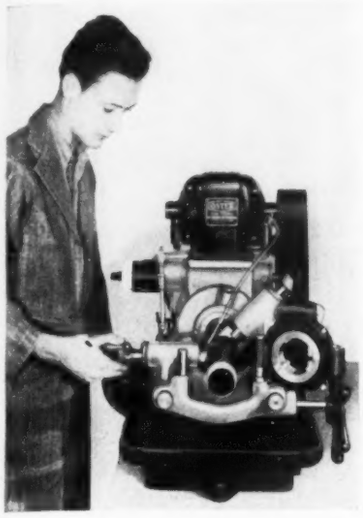
Pipe, Bolt Threading Machines

Oster-Williams, 2057 East Sixty-first place, Cleveland, recently brought out improved models of its Nos. 512 and 521 "Tom Thumb" pipe and bolt threading machines. Both are equipped with a new flared base for greater rigidity and protection against threading oil loss. The No. 512, shown on page 77, which has a capacity covering all sizes of pipe from ½ to 2 inches inclusive now is built with a rack and pinion feed for the die head carriage as well as a



No. 60 Greenerd self-contained hydraulic arbor press

thread length indicator that enables the operator to determine the exact length of thread to be cut without looking into the die head. The No. 521 which is recommended for bolt threading of the smaller sizes up to



Oster-Williams No. 512 pipe and bolt threading unit

1¼ inches, has an outboard support for its vise carriage ways and a rack and pinion feed for the carriage.

• • •

Total Time Meter—

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., recently brought out a total time meter for totalizing running or idle time on electrically-operated machinery including machine tools, welders, or any individual alternating-current powered unit. The instrument, shown herewith, registers hours, the mechanism having four dials that will register 9999 hours, approximately 400 days, before repeating. If desired, the meter can be mounted in the superintendent's or foreman's office by connecting it to the machine

Westinghouse meter for totalizing running or idle time

by a single pair of wires. It also can be furnished with a special register, providing one revolution per hour of the sweep hand.

• • •

High-Speed Hoist—

Wright Mfg. Division, American Chain Co. Inc., Bridgeport, Conn., is marketing an improved model spur geared chain hoist, shown herewith. One of the principal features is the zinc coating of all exposed parts, which makes it practical for outdoor use and for service in moist and other corrosive atmospheres. Wear is reduced to a minimum on all vital moving parts by a system of continuous lubrication of the positively sealed precision bearings.

Interior view of Wright improved model high-speed hoist

Additional minor improvements include hardened pawl tip, improved load chain guard and ball spring covers on oil tubes.

• • •

Combination Band Filing and Band Sawing Machine—

Continental Machine Specialties Inc., 1301 Washington avenue South, Minneapolis, is marketing a dual purpose unit, a band sawing and band filing machine that can be changed from one function to the other in less than three minutes. Inside sawing is accomplished by cutting the band saw blade, putting one end through a starting hole in the work, and then rewelding the saw blade in a self-contained electric brazing device. Inside filing

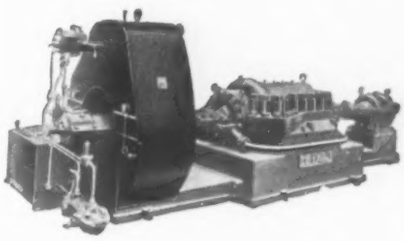
Continental combination band filing and band sawing unit

also can be done. The machine, shown herewith, finds its most immediate application in tool and die work, but is equally applicable wherever it is necessary to cut out holes and shapes in flat material.

• • •

Boiler Feed Pump—

De Laval Steam Turbine Co., Trenton, N. J., is building a boiler feed pump for pressures up to 1600 pounds and for temperatures around 300 degrees Fahr. A special feature of the unit, shown herewith, is the means employed for maintaining axial balance. Individual diaphragms between the



Combination De Laval boiler feed pump and booster pump, with steam turbine drive

stages are one-piece disks which contain the return passages to the eye of the next impeller and which fit into recesses in the pump casing and cover, being held tight against leakage by the pressure generated. Leakage from discharge to suction past the individual impellers is opposed by labyrinth rings.

New Trade Publications

Arc Welding—Hobart Bros Co., Troy, O. A bulletin on its 75-ampere arc welder, designed for welding of sheet metal down to 24 gage.

Arc Welding—Lincoln Electric Co., Cleveland. A 36-page catalog of electrodes and accessories for the arc welder, with discussion of technique.

Automatic Machines—Bullard Co., Bridgeport, Conn. A bulletin describing its type J Mult-Au-Matic, a small series with eight spindles, illustrated.

Blast Gates—W. S. Rockwell Co., 50 Church street, New York. A leaflet, No. 353, covering its Kwikleen type of blast gate, with illustrations and data tables.

Contactors—Electric Controller & Mfg. Co., Cleveland. Folder No. 1145, on its line arc contactors, with detailed description of the principles employed and illustrations.

Gear Lapping—Hutto Engineering Co., 515 Lycaste avenue, Detroit. A bulletin illustrating and describing its inclined axis machine for accurate finish of gears by a new process.

Socket Screws—Bristol Co., Waterbury, Conn. Bulletin No. 832 on its line of socket set screws and socket head cap screws, with discussion of principles and ample illustrations.

Tube Fabricating—Parker Appliance Co., Cleveland. Bulletin No. 40 on its equipment for fabricating tubular work, with instructions, full description and price lists.

Sleeve Clutch—Niagara Machine & Tool Works, 637 Northland avenue, Buffalo. A bulletin describing its new 14-point engagement sleeve clutch for power presses with detailed illustrations and description.

Laboratory Furnaces—Ajax Electrothermic Corp., Ajax Park, Trenton, N. J. Bulletin No. 9, describing the Ajax-Northrup line of small laboratory electric furnaces and converter for supplying current.

Synthetic Rubber—Thiokol Corp., Yardville, Trenton, N. J. A folder describing its synthetic rubber coating material for use on cloth, cork, leather, animal and vegetable fibers and metal.

Bronze Bars—Joseph T. Ryerson & Son Inc., Chicago. A 26-page booklet on Permite in six-foot lengths, cast bronze bars, for production of bushings and other machined bronze parts, assuring speed and economy.

Inclinable Presses—V & O Press Co., Hudson, N. Y. Catalog No. 35 on its inclinable presses, containing illustrations and descriptions, replacement charts, specification sheets and line drawings.

Electric Drill—Independent Pneumatic Tool Co., 600 West Jackson boulevard, Chicago. A bulletin, illustrated, featuring its U14 small electric drill, in which high efficiency has been combined with compactness. Catalog No. 32 covers the entire line of universal electric tools.

Grinder—Hill Clutch Machine & Foundry Co., 6400 Breakwater avenue, Cleveland. A bulletin illustrating and describing its hydraulic vertical grinder for precision surface and shear blade grinding.

Centrifugal Castings—Michigan Steel Casting Co., Detroit. Bulletin C-2, indicating its range of centrifugal castings of stainless, heat and corrosion resisting steel, well illustrated.

Built-Up Roofs—Johns-Manville, 22 East Fortieth street, New York. A brochure, with illustrations dedicated to the task of explaining advantages of carefully laid roofs of good material as an investment.

Variable Speed Transmission—Link-Belt Co., 300 West Pershing road, Chicago. Book No. 1574 on its positive infinitely variable speed transmission, with explanation of principles, illustrations, data tables.

Masonry Drills—Rawlplug Co. Inc., 98 Lafayette street, New York. Bulletin U-300, presenting data on three-point masonry drills, with instructions for efficient use and data tables on power hammers.

Insert Chaser Die Heads—Eastern Machine Screw Corp., New Haven, Conn. A bulletin describing its die heads, reciting their advantages and presenting data tables and illustrations.

Controller—Brown Instrument Co., Philadelphia. Catalog No. 8900 on its air operated controllers for control of temperature, pressure, flow and liquid level, illustrated and fully describing operation.

Metal Sprayer—Metallizing Co. of America Inc., 1218 Long Beach avenue, Los Angeles. A leaflet on its Metallizer gun for melting, atomizing and spraying metal on various surfaces as a protective or ornamental coating.

Welding—Harnischfeger Corp., Milwaukee. Bulletin No. HW-4, covering complete line of P & H-Hansen arc welders from 50 to 800-ampre units, welding fixtures and accessories and condensed specifications and performance data.

Gaskets—Goetze Gasket & Packing Co. Inc., New Brunswick, N. J. Catalog No. 48 on metallic and semi-metallic gaskets, sheet and stuffing-box packings, sealing compounds, gasket cutting tools, valve disks, filter screens and metal stampings.

Alloy Steels—Bethlehem Steel Co., Bethlehem, Pa. Catalog No. 107, illustrated and indexed, 376 pages devoted to the history of modern alloy steels, in bars, billets, blooms and slabs, to give alloy steel users dependable working data on properties and performance.

Grain Size Microscope—Bausch & Lomb Optical Co., Rochester, N. Y. A leaflet describing its new grain size measuring eyepiece, calibrated to A.S.T.M. standards, designed to give accurate measure of grain size by comparison with a standard square.

Die Heads—Geometric Tool Co., New Haven, Conn. Three bulletins: Combination circular and tangent chaser die heads; solid adjustable die heads in two styles; No. 12 threading machine.

Malleable Castings—Lake City Malleable Co., 5046 Lakeside avenue, Cleveland. A leaflet detailing information essential to be furnished by a castings buyer to the producer as a basis for patterns and cost estimates; based on American Foundrymen's association compilation.

Study High Temperature Applications of Metals

(*Concluded from Page* 70)

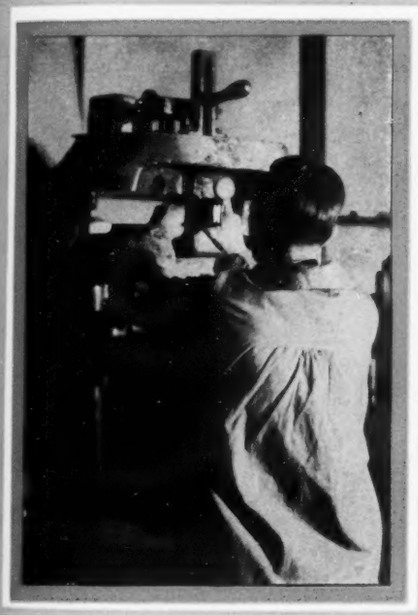
which destroy it rapidly. In other respects nickel-chromium and No. 10 alloy are not strictly comparable, as the extremely low cold deformability of the latter eliminates it from consideration for those hundreds of electrical heating applicattions that require a ductile resistor material in much finer sizes of wire than 8-gage. It would seem, Mr. Peters said, that an interesting comparison might be that between No. 10 alloy and the other iron-chromium-aluminum or the iron-chromium-aluminum-cobalt alloys. It is largely alloys of these types, rather than nickel-chromium, that No. 10 may replace in industrial service at the extremely high temperatures.

In a second written discussion, H. E. Koch, vice president, Hevi Duty Electric Co., Milwaukee, declared the development described by the authors is one which undoubtedly will have a far-reaching effect not only on the electric resistance furnace business but on process work above 2000 degrees Fahr. in many industries. Most laboratory furnaces using present-day nickel-chromium heating elements have been limited in operation to temperatures of 2000 degrees and there has been very little equipment available at reasonable prices which would lend itself to process application above that range.

Use of Smith Alloy No. 10, in laboratory furnaces and the related industrial application, continued Mr. Koch, is a direct step toward a remedy of this situation. When the ability of this new alloy to withstand elevated temperatures is coupled to the fact that electric heat moves into a field in which its operating costs are very definitely in line with low-priced fuels, we recognize that the authors have presented a work of major importance not only to the process industries but to the electrical industry in general.

COLD DRAWING

..... GIVES STEEL 70% to 100% GREATER WORKING STRENGTH



One of the most important determinations of the tensile test on steel bars is the yield point which denotes their real working strength.

• By our standard process of cold drawing, the ultimate strength of hot rolled steel bars is increased from 30% to 40% and their yield point or actual working strength from 70% to 100%.

There are several ways to take profitable advantage of the greater working strength of cold drawn steel. It may reduce your cost of material by permitting the use of less expensive steel grades. It may reduce your cost of production by eliminating the need for heat treatments. It may permit, through redesign of steel parts, the use of smaller and lighter sections without sacrificing strength. To these cost saving opportunities must always be added the better machinability and improved torsional strength which cold drawn steels provide.

Don't confine your cold drawn steel specifications solely to your needs for close accuracy to size, smooth surface and straightness. The value of its exceptional physical properties constitutes, for many applications, an extremely important consideration.

VIGILANT LABORATORY CONTROL

UNION DRAWN STEEL CO. MASSILLON, OHIO

SUBSIDIARY OF
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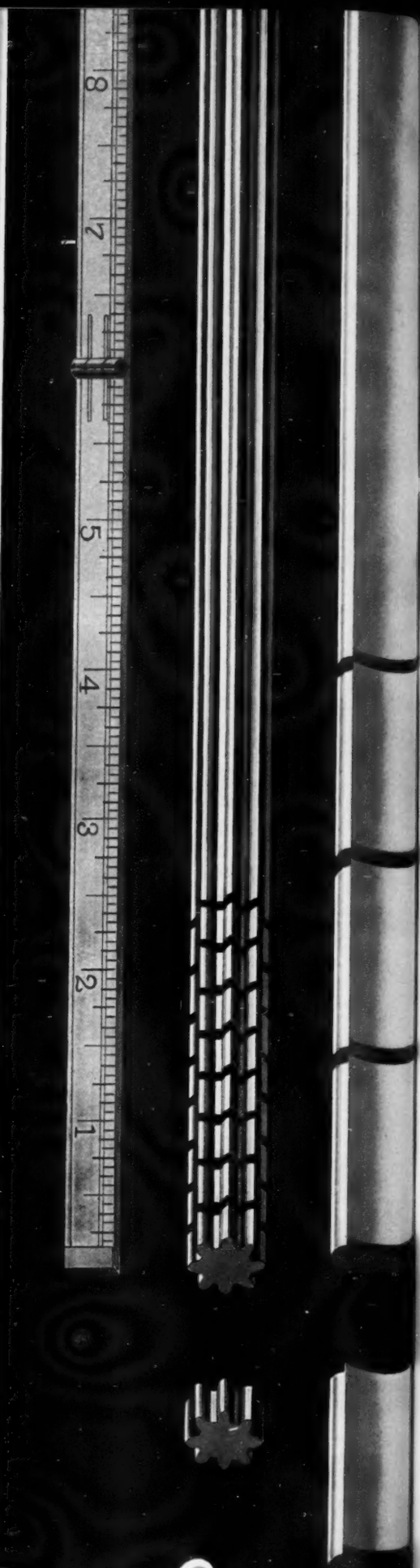
Cold Drawing Provides Maximum Machinability

STEEL PARTS "By the Foot" MAY SOLVE YOUR PROBLEM



● Applications of Union Cold Drawn Special Shapes have grown rapidly through recent years of business decline. Nothing could argue more convincingly for their far reaching economy.

The basis of this cost saving method lies in the similarity between the form of the special shaped bars and the parts to be manufactured. Its adoption can be approached from two standpoints. First — does the contour of the maximum cross section of the part lend itself to the economical use of a special shape? Second — can the design of the part be altered to permit the advantageous use of special shapes?

Other considerations may carry the investigation farther than these suggestions indicate but they serve as a general guide to the end in view. The parts here illustrated have uniform cross sections throughout their complete lengths and are simply cut from the special shaped bars.

Why not make a study right now of how you can adopt Union Cold Drawn Special Shapes to your production? We will be glad to aid you in that search for new economies. Perhaps some of the parts you make can be bought "by the foot."

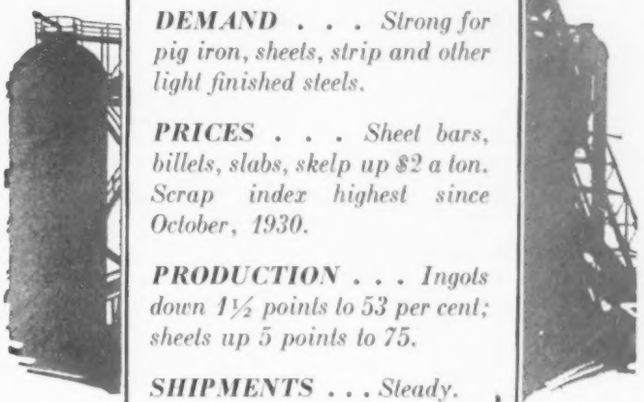
UNION DRAWN STEEL CO. MASSILLON, OHIO

SUBSIDIARY OF
REPUBLIC STEEL CORPORATION

Union Cold Drawn Steels

Steel Rate Drops 1½ Points as Prices Rise

Bulge in Shipments Expected Before Jan. 1; Scrap Up; Rail Prospects Improve



MARKET IN TABLOID

DEMAND *. . . Strong for pig iron, sheets, strip and other light finished steels.*

PRICES *. . . Sheet bars, billets, slabs, skelp up $2 a ton. Scrap index highest since October, 1930.*

PRODUCTION *. . . Ingots down 1½ points to 53 per cent; sheets up 5 points to 75.*

SHIPMENTS *. . . Steady.*

ACTUAL consumer requirements, and not an artificial demand stimulated by rising prices, still are the determining factors in steelworks operations, which last week dropped 1½ points to 53 per cent.

Semifinished steels have been raised $2 a ton, following the increase of $1 a ton in pig iron. Finished steel products are expected to respond shortly. Scrap prices have already snapped up to the highest level since October, 1930. Yet, so far large speculative orders are relatively few.

The explanation is that consumers have been given an opportunity to cover for the rest of the quarter, and the really effective date for higher prices will not come before Jan. 1. Therefore, steelmakers do not expect a rush in shipments, to accelerate operations, until late this month or December. This was the industry's experience when prices were raised in the second quarter of 1934.

A year-end bulge in demand is unusual, but not without precedent, and it is being fostered by continued strong support from automobile manufacturers, prospects for considerable railroad buying soon for early 1936, and structural awards sustained by federal projects.

Introduction of new automobile models at this time is largely responsible for an exceptionally steady rate of steelworks operations, which for the past 13 weeks have not varied more than 3½ points. Car output last week again increased, 14,000 units to 90,000.

Raw material markets are exhibiting strong contra-seasonal activity. Pig iron shipments, after rising sharply in October, so far in November are 30 per cent ahead of the October rate; coke, 20 per cent. Scrap prices are up at Chicago and Pittsburgh. A leading steelworks at Pittsburgh purchased 20,000 tons of heavy melting steel. Lake Superior iron ore consumption in October, estimated at 2,976,000 tons, was the highest of any month since October, 1930.

Weather conditions in most sections of the country are favoring outdoor work, one factor contributing to a 5-point rise to 75 per cent in sheet mill operations being large consumption of galvanized sheets. For full-finished sheets and enameling stock, used by a wide range of manufacturers, earliest delivery dates now extend three to five weeks ahead.

Structural shape awards for the week held close to recent averages, at 21,750 tons. This year there has been a 20 per cent increase over 1934 in awards for industrial and commercial buildings. The Los Angeles water district, among the largest buyers of construction steel this year, awarded 14,500 tons of reinforcing bars. Bids are being taken on 14,000 tons of shapes for the Imperial dam in the Boulder canyon project.

Louisville & Nashville placed 20,000 tons of rails. Chicago mills anticipate inquiries shortly for 40,000 tons of rails for western roads. October freight car awards totaled 1250, except for June with 5151, highest this year.

Daily average steel ingot production in October, 115,414 gross tons, was 1.9 per cent above September. Output for the month was 3,116,184 tons, compared with 2,829,835 tons in September. This was the largest October tonnage since 1929. For ten months this year, 27,160,260 tons is a gain of 23 per cent over the first ten in 1934.

Pittsburgh steelworks operations last week declined 3 points to 44 per cent; Cleveland 3 to 69; Birmingham ½-point to 58; Detroit 6 to 88; Buffalo 5 to 37. Chicago advanced ½-point to 55½; eastern Pennsylvania ½-point to 39. Other districts were unchanged.

STEEL's iron and steel price composite is up 18 cents to $33.16; the finished steel composite is unchanged at $53.70, and the scrap index is up 16 cents to $12.83.

COMPOSITE MARKET AVERAGES

	Nov. 9	Nov. 2	Oct. 26	One Month Ago Oct., 1935	Three Months Ago Aug., 1935	One Year Ago Nov., 1934	Five Years Ago Nov., 1930
Iron and Steel	$33.16	$32.98	$32.85	$32.84	$32.68	$32.15	$31.95
Finished Steel	53.70	53.70	53.70	53.70	54.02	54.00	49.62
Steelworks Scrap	12.83	12.67	12.67	12.72	12.05	9.82	11.17

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Nov. 9, 1935	Oct. 1935	Aug. 1935	Nov. 1934
Steel bars, Pittsburgh	1.85c	1.85c	1.80c	1.80c
Steel bars, Chicago	1.90	1.90	1.85	1.85
Steel bars, Philadelphia	2.16	2.16	2.11	2.09
Iron bars, Terre Haute, Ind.	1.75	1.75	1.75	1.75
Shapes, Pittsburgh	1.80	1.80	1.80	1.80
Shapes, Philadelphia	2.01½	2.01½	2.01½	2.00½
Shapes, Chicago	1.85	1.85	1.85	1.85
Tank plates, Pittsburgh	1.80	1.80	1.80	1.80
Tank plates, Philadelphia	2.00	1.99	1.99	1.98½
Tank plates, Chicago	1.85	1.85	1.85	1.85
Sheets, No. 10, hot rolled, Pitts.	1.85	1.85	1.85	1.85
Sheets, No. 24, hot ann., Pitts.	2.40	2.40	2.40	2.40
Sheets, No. 24, galvan., Pitts.	3.10	3.10	3.10	3.10
Sheets, No. 10, hot rolled, Gary	1.95	1.95	1.95	1.95
Sheets, No. 24, hot anneal., Gary	2.55	2.55	2.55	2.55
Sheets, No. 24, galvan., Gary	3.20	3.20	3.20	3.20
Plain wire, Pittsburgh	2.30	2.30	2.30	2.30
Tin plate, per base box, Pitts.	5.25	5.25	5.25	5.25
Wire nails, Pittsburgh	2.40	2.40	2.55	2.60

Semifinished Material

Sheet bars, open-hearth, Youngs	$30.00	$28.00	$28.00	$28.00
Sheet bars, open-hearth, Pitts.	30.00	28.00	28.00	28.00
Billets, open-hearth, Pittsburgh	29.00	27.00	27.00	27.00
Wire rods, Pittsburgh	38.00	38.00	38.00	38.00

Pig Iron

	Nov. 9, 1935	Oct. 1935	Aug. 1935	Nov. 1934
Bessemer, del. Pittsburgh	20.81	$19.81	$19.81	$19.76
Basic, Valley	19.00	18.00	18.00	18.00
Basic, eastern, del. eastern Pa.	20.81	19.81	19.81	19.76
No. 2 foundry, del. Pittsburgh	20.31	19.31	19.31	19.26
No. 2 foundry, Chicago	19.50	18.75	18.50	18.50
Southern No. 2, Birmingham	14.50	14.50	14.50	14.50
No. 2X eastern, del. Philadelphia	21.68	20.68	20.68	20.63
Malleable, Valley	19.50	18.50	18.50	18.50
Malleable, Chicago	19.50	18.75	18.50	18.50
Lake Superior charcoal del. Chi.	25.25	24.90	24.25	24.04
Ferromanganese, del. Pittsburgh	90.13	90.13	90.13	89.79
Gray forge, del. Pittsburgh	19.67	18.67	18.67	18.63

Scrap

Heavy melting steel, Pittsburgh	$13.75	$13.65	$13.25	$11.15
Heavy melt. steel, No. 2, east. Pa.	11.00	11.00	10.50	8.35
Heavy melting steel, Chicago	12.75	12.50	12.35	9.10
Rails for rolling, Chicago	14.00	14.00	13.65	10.35
Railroad steel specialties, Chicago	13.25	13.50	13.55	10.05

Coke

Connellsville, furnace, ovens	$3.55	$3.55	$3.25	$3.60
Connellsville, foundry, ovens	4.35	4.35	4.00	4.60
Chicago, by-product foundry, del.	9.75	9.75	9.25	9.25

Steel, Iron, Raw Material, Fuel and Metals Prices

Except when otherwise designated, prices are base, f.o.b. cars. Asterisk denotes price change this week

Sheet Steel

Hot Rolled No. 10, 24-48 in.

Pittsburgh	1.85c
Gary	1.95c
Chicago, delivered	1.98c
New York, del.	2.20c
Philadelphia, del.	2.16c
Birmingham	2.00c
St. Louis, del.	2.18c
Pacific ports, f.o.b. cars, dock	2.40c

Hot Rolled Annealed No. 24

Pittsburgh	2.40c
Gary	2.50c
Chicago, delivered	2.53c
Detroit, delivered	2.60c
New York, del.	2.75c
Philadelphia, del.	2.71c
Birmingham	2.55c
St. Louis, del.	2.72c
Pacific ports, f.o.b. cars, dock	3.05c

Galvanized No. 24

Pittsburgh	3.10c
Gary	3.20c
Chicago, delivered	3.23c
Philadelphia, del.	3.41c
New York, del.	3.45c
Birmingham	3.25c
St. Louis, del.	3.43c
Pacific ports, f.o.b. cars, dock	3.70c

Tin Mill Black No. 28

Pittsburgh	2.75c
Gary	2.85c
St. Louis, delivered	3.08c

Cold Rolled No. 10

Pittsburgh	2.50c
Gary	2.60c
Detroit, delivered	2.70c
Philadelphia, del.	2.81c
New York, del.	2.85c
Pacific ports, f.o.b. cars, dock	3.10c

Cold Rolled No. 20

Pittsburgh	2.95c
Gary	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.26c
New York, del.	3.30c

Enameling Sheets

Pittsburgh, No. 10	2.50c
Pittsburgh, No. 20	3.10c
Gary, No. 10	2.60c
Gary, No. 20	3.20c

Tin and Terne Plate

Gary base, 10 cents higher.

Tin plate, coke base (box) Pittsburgh	$5.25
Do., waste-waste	2.75c
Do., strips	2.50c
Long ternes, No. 24 unassorted, Pitts.	3.40c
Do., Gary	3.50c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	23.00	24.00
Plates	26.00	28.00
Sheets	33.00	35.00
Hot strip	20.75	22.75
Cold strip	27.00	29.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	17.00	18.50	21.00	26.00
Plates	20.00	21.50	24.00	29.00
Sheets	25.00	28.00	31.00	35.00
Hot strip	15.75	16.75	21.75	26.75
Cold strip	20.50	22.00	27.00	35.00

Steel Plates

Pittsburgh	1.80c
New York, del.	2.09c
Philadelphia, del.	1.99c
Boston, delivered	2.22c
Buffalo, delivered	2.05c
Chicago or Gary	1.85c
Cleveland, del.	1.99½c
Birmingham	1.95c
Coatesville, base	1.90c
Sparrows Pt., base	1.90c
Pacific ports, f.o.b. cars, dock	2.35c
St. Louis, delivered	2.08c

Structural Shapes

Pittsburgh	1.80c
Philadelphia, del.	2.01½c
New York, del.	2.06½c
Boston, delivered	2.20½c
Bethlehem	1.90c
Chicago	1.85c
Cleveland, del.	2.00c
Buffalo	1.90c
Gulf Ports	2.20c
Birmingham	1.95c
Pacific ports, f.o.b. cars, dock	2.35c

Bars

Soft Steel

(Base, 5 to 25 tons)

Pittsburgh	1.85c
Chicago or Gary	1.90c
Duluth	2.00c
Birmingham	2.00c
Cleveland	1.90c
Buffalo	1.95c
Detroit, delivered	2.00c
Pacific ports, f.o.b. cars, dock	2.40c
Philadelphia, del.	2.16c
Boston, delivered	2.27c
New York, del.	2.20c
Pitts., forg. qual.	2.10c

Rail Steel

To Manufacturing Trade

Pittsburgh	1.70c
Chicago or Gary	1.75c
Moline, Ill.	1.75c
Cleveland	1.75c
Buffalo	1.80c

Iron

Troy, N. Y.	1.70c
Terre Haute, Ind.	1.75c
Chicago	1.80c
Philadelphia	2.06c
Pittsburgh, refined	2.75-7.50c

Reinforcing

New billet, straight lengths, quoted by distributors.

Pittsburgh	2.05c
Chicago, Gary, Buffalo, Cleve., Birm., Young.	2.10c
Gulf ports	2.45c
Pacific coast ports f.o.b. cars dock	2.45c
Philadelphia, del.	2.36c

Rail steel, straight lengths, quoted by distributors

Pittsburgh	1.90c
Chicago, Buffalo, Cleveland, Birm., Young.	1.95c
Gulf ports	2.30c

Wire Products

(Prices apply to straight carloads; less than straight carloads take trade quantity extras; 10% dis. on nail extras on straight or mixed carloads to one consignee.)

Base Pitts.-Cleve. 100 lb. keg.	
Standard wire nails	$2.40
Cement coated nails	2.40
Galvanized nails, 15 gage and coarser	4.40
do. finer than 15 gage	4.90

(Per pound)

Polished staples	3.10c
Galvanized fence staples	3.35c
Barbed wire, galv.	2.80c
Annealed fence wire	2.45c
Galvanized fence wire	2.80c
Woven wire fencing (base column, c.l.)	$58.00

To Manufacturing Trade

Plain wire, 6-9 gage	2.30c

Anderson, Ind. (merchant products only) and Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire, Pittsburgh or Cleveland	2.90c

Do., Chicago up $1, Worcester, $2.

Cold-Finished Carbon Bars and Shafting

Base, Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs.	1.95c
20,000 to 59,999 lbs.	1.90c
60,000 to 99,999 lbs.	1.85c
100,000 lbs. and over	1.82½c

Gary, Ind., Cleve., Chi., up 5c; Buffalo, up 10c; Detroit, up 20c; eastern Michigan, up 25c.

Alloy Steel Bars (Hot)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.45c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20
4100 0.15 to 0.25 Mo.			0.50
4600 0.20 to 0.30 Mo. 1.25-1.75 Ni.			1.05
5100 0.80-1.10 Cr.			0.45
5100 Cr. spring			base
6100 bars			1.20
6100 spring			0.70
Cr., Ni., Van.			1.50
Carbon Van.			0.95
9250	carbon base plus extras		

Piling

Pittsburgh	2.15c
Chicago, Buffalo	2.25c

Strip and Hoops

Hot strip to 23⅛-in. Pittsburgh	1.85c
Chicago or Gary	1.95c
Birmingham base	2.00c
Detroit, delivered	2.05c
Philadelphia, del.	2.16c
New York, del.	2.20c
Cooperage hoop, Pittsburgh	1.95c
Chicago	2.05c
Cold-strip strip, Pitts., Cleve.	2.60c
Worcester, Mass.	2.80c

Rails, Track Material

(Gross Tons)

Standard rails, mill	$36.37½
Relay rails, Pitts. 20-45 lbs.	$28.00
45-50 lbs.	$25.00
50-60 lbs.	$26.00
70-75 lbs.	$24.50
80-90 lbs.	$26.00
100 lbs.	$27.00
Light rails, billet qual. Pitts., Chi.	$35.00
Do., reroll, qual.	34.00
Angle bars, billet, Gary, Ind., So. Chi.	2.55c
Do., axle steel	2.10c
Spikes, R. R. base	2.40c
Track bolts, base	3.55c
Tie plates, base	1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $2; 16 and 20 lbs., up $1; 12 lbs. up $2; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade for all case lots, Dec. 1, 1932, lists, 10% extra for less full containers.

Carriage Bolts

All sizes, cut thread	75 off
Rolled thread, ½ x 6, smaller	75 off

Machine Bolts

All sizes, cut thread lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts	75 off
Tire bolts	60 off
Stove bolts, 75 off in pkgs.; 83 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.	
Rolled thread machine, ½ x 6, smaller	75 off
Step bolts	70 off
Elevator bolts	70 off

Nuts

S.A.E. semifinished hex.; ½ to ⅞-inch	75 off
Do., ½ to 1-inch	75 off
Do., over 1-inch	70 off

Hexagon Cap Screws

Milled	80-10-10 off
Upset, 1-in., smaller	85 off

Square Head Set Screws

Upset, 1-in., smaller	75-10 off
Headless set screws	75 off

Rivets, Wrought Washers

Struc., c. l., Pittsburgh, Cleveland	2.90c
Struc., c. l., Chicago	3.00c
⅞-in. and smaller, Pitts., Chi., Cleve.	70 and 5 off
Wrought washers, Pitts., Chi., Phila., to jobbers & large nut, bolt mfrs.	$6.25 off

Cut Nails

Cut nails, Pitts.; (10% discount on size extras)	$2.75
Do. less carloads, 5 kegs or more no discount on size extras	$3.05
Do. under 5 kegs; no discount on size extras	$3.20

Pipe and Tubing

Base $200 net ton, expect on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago, del. 2½ points less. Wrought pipe, Pittsburgh.

Butt Weld

Steel

In.	Blk.	Galv.
¼ and ⅜	53½	35
½	58½	47
¾	62	52
1—3	64	55

Iron

½	31½	15
¾	36½	20½
1—1¼	39½	25½
2	41½	26

Lap Weld

Steel

2	60	51
2½—3	63	54
3½—6	65	56
7 and 8	64	54
9 and 10	63½	53½

Iron

2	37	22½
2½—3½	38	25
4—8	40	28½

Line Pipe

Steel

½, butt weld	57½
⅛-inch, butt weld	50½
¼—⅜, butt weld	52½
¾, butt weld	61
1—3, butt weld	63
2-inch, lap weld	59
2½—3, lap weld	62
3½—6, lap weld	64
7—8, lap weld	63

Iron

⅛—1½ inch, black and galv. take 4 pts. over; 2½—6 inch 2 pts. over discounts for same sizes, standard pipe lists, 8—12-inch, no extra.

Boiler Tubes

C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		Charcoal Iron	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3½	50	3	17
4	52	3¼—3½	18
4½—5	42	4	20
		4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 200 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron: 10,000 pounds to carloads, base less 5%; under 10,000 lbs., 2 points under base.

Seamless Boiler Tubes

Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots or 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are noted for 55 cold-drawn boiler tube sizes ranging from ¼ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet and per pound. Less-carloads revised as of July 1, 1935, card.

Hot-finished carbon steel boiler tube prices also under date of May 15 range from 1 through 7 inches outside diameter, inclusive, and embrace 47 size classifications in 22 decimal wall thicknesses ranging from 0.109 to 1.000, prices also being on a lb. and 100 ft. basis.

Seamless Tubing

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$39.00-40.00
4-in., Birmingham	42.00-43.00
4-in., Chicago	50.40-51.40
6 to 24-in. Chicago	47.40-48.40
6-in. & over, east. fdy.	43.00
Do., 4-in.	46.00

Class A pipe $3 over Class B. Stnd. fitgs., Birm. base. $100.00

Semifinished Steel

Billets and Blooms

4 x 4-inch base; gross ton

*Pitts., Chi., Cleve., and Youngstown	$29.00
*Philadelphia	34.67
*Duluth	31.00

Forging Billets

6 x 6 to 9 x 9-in., base

Pitts., Chi., Buff.	35.00
Forging, Duluth	37.00

Sheet Bars

*Pitts., Cleve., Young., Chi., Buff., Canton,	30.00
Do.	28.00

Slabs

*Pitts., Chi., Cleve., Young.	29.00

Wire Rods

(Common; combination up $2)

Pitts., Cleveland	38.00
Chicago	39.00
Worcester, Mass.	40.00

Skelp

*Pitts., Chi., Young., Buff.	1.80c
Do.	1.70c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.55- 3.75
Connellsville, fdry.	4.35- 4.50
Connel., prem. fdry.	5.50- 5.75
New River fdry.	6.00
Wise county fdry.	4.45- 5.00
Wise county fur.	4.00- 4.50

By-Product Foundry

Newark, N. J., del.	9.20- 9.65
Chi., ov., outside del.	9.00
Chicago, del.	9.75
New England, del.	11.50
St. Louis, del.	10.00
Birmingham, ovens	6.00
Indianapolis, del.	9.40
Cincinnati, del.	9.50
Cleveland, del.	9.75
Buffalo, ovens	7.50- 8.00
Detroit, ov., out. del.	9.00
Philadelphia, del.	9.03

Coke By-Products

Per gallon, producers' plants.

	Tank lots	Spot
*Pure and 90% benzol		18.00c
Toluol		30.00c
Solvent naphtha		30.00c
Commercial xylol		30.00c

Per lb. f.o.b. New York.

Phenol (200 lb. drums)	16.30c
Do. (100 lbs.)	17.30c

Eastern Plants, per lb.

*Naphthalene flakes and balls, in bbls., to jobbers	6.75c

Per 100 lb. Atlantic seaboard

Sulphate of ammonia	$1.20

†Western prices, ½-cent up.

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25; 50c diff. for each 0.25 below 1.75. Gross tons.

Basing Points:	No. 2 Fdry.	Malle-able	Basic	Besse-mer
Bethlehem, Pa.	$20.50	$21.00	$20.00	$21.50
Birdsboro, Pa.	20.50	21.00	20.00	21.50
Birmingham, Ala., southern del.	14.50	14.50	13.50	20.00
Buffalo	19.50	20.00	18.50	20.50
Chicago	19.50	19.50	19.00	20.00
Cleveland	19.50	19.50	19.00	20.00
Detroit	19.50	19.50	19.00	20.00
Duluth	20.00	20.00	.....	20.50
Erie, Pa.	19.50	20.00	19.00	20.50
Everett, Mass.	20.50	21.00	20.00	21.50
*Hamilton, O.	19.50	19.50	19.00	.....
Jackson, O.	20.25	20.25	19.75	.....
Neville Island, Pa.	19.50	19.50	19.00	20.00
Provo, Utah	17.50	.....	17.00	.....
Sharpsville, Pa.	19.50	19.50	19.00	20.00
Sparrows Point, Md.	20.50	.....	20.00	.....
Swedeland, Pa.	20.50	21.00	20.00	21.50
Toledo, O.	19.50	19.50	19.00	20.00
Youngstown, O.	19.50	19.50	19.00	20.00
Delivered from Basing Points:				
Akron, O., from Cleveland	20.76	20.76	26.26	21.26
Baltimore from Birmingham	21.08	.....	19.96	.....
Boston from Birmingham	20.62	.....	20.50	.....
Boston from Everett, Mass.	21.00	21.50	20.50	22.00
Boston from Buffalo	21.00	21.50	20.50	22.00
Brooklyn, N. Y., from Bethlehem	22.93	23.43	.....	.....
Brooklyn, N. Y., from Bmghm.	22.50	.....	.....	.....
Canton, O., from Cleveland	20.76	20.76	20.26	21.26
Chicago from Birmingham	†19.72	.....	19.60	.....
*Cincinnati from Hamilton, O.	20.58	20.58	20.08	.....
Cincinnati from Birmingham	20.20	.....	19.70	.....
Cleveland from Birmingham	19.62	.....	19.12	.....
*Indianapolis from Hamilton, O.	21.93	21.93	21.43	22.43
Mansfield, O., from Toledo, O.	21.26	21.26	20.76	21.76
Milwaukee from Chicago	20.57	20.57	20.07	21.07
Muskegon, Mich., from Chicago Toledo or Detroit	22.60	22.60	22.10	23.10
Newark, N. J., from Birmingham	21.61	.....	.....	.....
Newark, N. J., from Bethlehem	21.99	22.49	.....	.....
Philadelphia from Birmingham	20.93	.....	20.81	.....
Philadelphia from Swedeland, Pa.	21.31	21.81	20.81	.....
Pittsburgh district from Neville Island	Neville base plus 67c, 81c and $1.21 switching charges			
Saginaw, Mich., from Detroit	21.75	21.75	21.25	21.25
Delivered from Basing Points:	No. 2 Fdry	Malle-able	Basic	Besse-mer
St. Louis, northern	20.00	20.00	19.50	.....
St. Louis from Birmingham	†19.62	.....	19.50	.....
St. Paul from Duluth	21.94	21.94	.....	22.44

†Over 0.70 phos.

Low Phos

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $24.00, Phila. base, standard and copper bearing, $25.13.

Gray Forge		Charcoal	
Valley furnace	19.00	Lake Superior fur.	$22.00
Pitts. dist. fur.	19.00	Do., del. Chicago	25.25

Silvery†

*Jackson county, O., base: 6 to 6.50 per cent $22.75; 6.51 to 7 per cent $23.25; 7 to 7.50 per cent $23.75; 7.51 to 8 per cent $24.25; 8 to 8.50 per cent $24.75; 8.51 to 9 per cent $25.25; 9 to 9.50 per cent $25.75; 9.51 to 10 per cent $26.25. Buffalo up $1.25.

Bessemer Ferrosilicon†

*Jackson county, O., base: Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon: 2 to 3%, $1 per ton additional.

Refractories

Per 1000 f.o.b. Works

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$55.00

First Quality

Pa., Ill., Md., Mo.	$45.00
Alabama, Ga., Ky.	$40.00-45.00

Second Quality

Pa., Ill., Ky., Md., Mo.	40.00
Ga., Ala.	35.00

Ohio

First quality	$40.00
Intermediary	37.00
Second quality	28.00

Malleable Bung Brick

All bases	50.00

Silica Brick

Pennsylvania	$45.00
Joliet, E. Chicago	54.00
Birmingham, Ala.	52.00

Magnesite

Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	40.00
Domestic dead-burned gr. net ton f.o.b. Chewelah, Wash. (bulk)	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$45.00
Chemically bonded chrome brick	45.00
Magnesite brick	65.00
Chemically bonded magnesite brick	55.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$20.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads	$16.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid	85.00
Do., Balti. base	85.00
Do., del. Pittsb'gh	90.13
Spiegeleisen, 19-20% dom. Palmerton, Pa., spot†	26.00
Do., New Orleans	26.00
Ferrosilicon, 50% freight all., cl.	77.50
Do., less carload	85.00
Do., 75 per cent	126-130.00
Spot, $5 a ton higher.	
Silicoman., 2½ carb.	90.00
2% carbon, 95.00; 1%,	105.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del.	10.00
Ferrotungsten, stand., lb. con. del.	1.35- 1.45
Ferrovanadium, 35 to 40% lb., cont.	2.70- 2.90
Ferrotitanium, c. l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt. allow., lb.	7.00
Do., under 1 ton	7.50
Ferrophosphorus, per ton, c. l., 17-19% Rockdale, Tenn., basis, 18%, $2 unitage	50.00
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $2.75 unitage	65.00
Ferromolybdenum, stand. 55-65%, lb.	0.95
Molybdate, lb. cont.	0.80

†Carloads, Quan. diff. apply.

Nonferrous

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin: New York Spot	Straits Tin: New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Alumi-num 99%	Antimony Chinese Spot, N. Y.	Nickel Cath-odes
Nov. 2	9.25	9.37½	8.85	51.75	48.37½	4.50	4.35	4.85	*19.00	15.00	35.00
Nov. 4	9.25	9.37½	8.85	51.75	48.20	4.50	4.35	4.85	*19.00	15.00	35.00
Nov. 5—Holiday											
Nov. 6	9.25	9.37½	8.85	52.50	48.50	4.50	4.35	4.85	*19.00	15.00	35.00
Nov. 7	9.25	9.37½	8.85	52.00	48.37½	4.50	4.35	4.85	*19.00	15.00	35.00
Nov. 8	9.25	9.37½	8.85	52.50	48.75	4.50	4.35	4.85	*19.00	15.00	35.00

*Nominal range 19.00 to 21.00c.

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 9.00c Conn. copper.

Sheets	
Yellow brass (high)	14.62½
Copper hot rolled	16.25
Lead cut to jobbers	8.25
Zinc, 100-lb. base	9.50
Tubes	
High yellow brass	16.62½
Seamless copper	16.75
Rods	
High yelow brass	13.12½
Copper, hot rolled	13.50
Anodes	
Copper untrimmed	14.00
Wire	
Yellow brass (high)	15.12½

OLD METALS

Deal. buying prices, cents lb.

No. 1 Composition Red Brass	
New York	5.50- 5.75
Cleveland	5.87½-6.12½
Chicago	5.87½- 6.00
St. Louis	6.00- 6.25
Heavy Copper and Wire	
*New York, No. 1	6.87½-7.12½
Chicago, No. 1	6.87½-7.12½
Cleveland	6.75- 7.00
St. Louis, No. 1	7.25- 7.37½
Composition Brass Borings	
New York	5.00- 5.25
Light Copper	
New York	5.75- 6.00
Chicago	5.37½-5.62½
Cleveland	5.75- 6.00
St. Louis	6.00- 6.25
Light Brass	
Chicago	3.25- 3.50
Cleveland	3.12½-3.37½
St. Louis	3.50- 3.75
Lead	
New York	3.50- 3.75
Cleveland	3.25- 3.50
Chicago	3.37½-3.62½
St. Louis	3.75- 3.85
Zinc	
New York	2.00- 2.25
Cleveland	2.50- 2.75
St. Louis	2.75- 3.00
Aluminum	
Borings, Cleveland	8.50- 9.00
Mixed, cast, Cleve.	13.25-13.50
Mixed, cast. St. L.	13.00-13.50
Clips, soft, Cleve.	14.75-15.00

SECONDARY METALS

Brass ingot, 85-5-5-5	9.25
Stand. No. 12 alum.	17.00-17.50

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	8.50- 9.50
Boston, dock, expt.	9.25- 9.50
Boston, domestic	7.50- 7.75
Buffalo, No. 1	11.50-12.00
Buffalo, No. 2	10.00-10.50
Chicago, No. 1	12.50-13.00
Cleveland, No. 1	12.00-12.50
Cleveland, No. 2	11.00-11.50
Detroit, No. 1	9.50-10.00
Detroit, No. 2	7.50- 8.00
Eastern Pa., No. 1	12.00
Eastern Pa., No. 2	11.00
Federal, Ill.	9.25- 9.75
Granite City, R. R.	10.25-10.75
Granite City, No. 2	8.75- 9.25
N. Y., deal. No. 2	7.50- 7.75
N. Y., deal. barge	8.50- 8.75
Pitts., No. 1 (R. R.)	14.50-15.00
Pitts., No. 1 (dlr.)	13.50-14.00
Pittsburgh, No. 2	11.75-12.25
St. Louis	8.75- 9.25
Valleys, No. 1	13.50-14.00

COMPRESSED SHEETS

Buffalo, dealers	10.00-10.50
Chicago, factory	11.50-12.00
Chicago, dealer	10.25-10.75
Cleveland	11.50-12.00
Detroit	10.00-10.50
E. Pa., new mat.	11.50-12.00
Pittsburgh	13.25-13.75
St. Louis	6.25- 6.75
Valleys	12.75-13.00

BUNDLED SHEETS

Buffalo	8.00- 8.50
Cincinnati, del.	7.50- 8.00
Cleveland	9.50-10.00
Pittsburgh	11.75-12.25
St. Louis	4.50- 5.00

SHEET CLIPPINGS, LOOSE

Chicago	8.00- 8.50
Cincinnati	7.00- 7.50
Detroit	5.00- 5.50
St. Louis	4.75- 5.25

STEEL RAILS, SHORT

Birmingham	12.00-12.50
Buffalo	14.50-15.00
Chicago (3 ft.)	14.00-14.50
Chicago (2 ft.)	15.00-15.50
Cincinnati, del.	13.50-14.00
Detroit	12.50-13.00
Pitts., open-hearth, 3 ft. and less	15.25-15.75
St. Louis, 2 ft. & less	13.25-13.75

STEEL RAILS, SCRAP

Boston	7.50- 7.75
Chicago	12.50-13.00
Pittsburgh	14.00-14.50
St. Louis	11.50-12.00
Buffalo	11.50-12.00

STOVE PLATE

Birmingham	7.00- 7.50
Boston, dealers	3.50- 3.75
Buffalo	10.25-10.75
Chicago	8.00- 8.50
Cincinnati, dealers	7.00- 7.50
Detroit, net	7.00- 7.50
Eastern Pa.	9.50
N. Y., deal. fdry.	6.00
St. Louis	8.00- 8.50

COUPLERS, SPRINGS

Buffalo	14.50-15.00
Chicago, springs	13.50-14.00
Eastern Pa.	14.50-15.00
Pittsburgh	15.50-16.00
St. Louis	12.00-12.50

ANGLE BARS—STEEL

Chicago	13.00-13.50
St. Louis	12.00-12.50

RAILROAD SPECIALTIES

Chicago	13.00-13.50

LOW PHOSPHORUS

Buffalo, billet and bloom crops	14.50-15.00
Cleveland, billet, bloom crops	15.00-15.50
Eastern Pa., crops	15.50-16.00
Pittsburgh, billet, bloom crops	16.00-16.50
Pittsburgh, sheet bar crops	14.75-15.25

FROGS, SWITCHES

Chicago	12.25-12.75
St. Louis, cut	11.50-12.00

SHOVELING STEEL

Chicago	12.50-13.00
Federal, Ill.	9.25- 9.50
Granite City, Ill.	8.75- 9.25

RAILROAD WROUGHT

Birmingham	7.00- 7.50
Boston, dealers	6.00- 6.50
Buffalo, No. 1	10.00-10.50
Buffalo, No. 2	11.50-12.00
Chicago, No. 1, net	9.50-10.00
Chicago, No. 2	12.50-13.00
Cincinnati, No. 2	9.50-10.00
Eastern Pa.	12.00-12.50
N. Y., No. 1, deal.	9.50-10.00
St. Louis, No. 1	6.75- 7.20
St. Louis, No. 2	10.25-10.75

SPECIFICATION PIPE

Boston	3.00- 3.25
Eastern Pa.	10.00-11.00
New York, dealers	3.50- 4.00

BUSHELING

Buffalo, No. 1	10.00-10.50
Chicago, No. 1	11.00-11.50
Cinci., No. 1, deal.	7.50- 8.00
Cincinnati, No. 2	4.00- 4.50
Cleveland, No. 2	8.00- 8.50
Detroit, No. 1, new	8.50- 9.00
Valleys, new, No. 1	12.50-12.75

MACHINE TURNINGS

Birmingham	4.00- 4.50
Boston, dealers	3.25- 3.50
Buffalo	5.75- 6.25
Chicago	6.50- 7.00
Cincinnati, dealers	5.50- 6.00
Cleveland	7.50- 8.00
Detroit	5.25- 5.75
Eastern Pa.	7.50- 8.00
New York, dealers	3.50- 3.75
Pittsburgh	9.50-10.00
St. Louis	2.25- 2.75
Valleys	9.00- 9.50

BORINGS AND TURNINGS

For Blast Furnace Use

Boston, dealers	2.50- 2.75
Buffalo	7.75- 8.25
Cincinnati, dealers	5.00- 5.50
Cleveland	7.50- 8.00
Detroit	5.25- 5.75
Eastern Pa.	6.00- 6.50
New York, dealers	1.50- 1.75
Pittsburgh	8.00- 9.00

CAST IRON BORINGS

Birmingham, plain	4.00- 4.50
Boston, chemical	5.50- 6.50
Boston, dealers	3.25- 3.50
Buffalo	7.75- 8.25
Chicago	6.00- 6.50
Cincinnati, dealers	5.00- 5.50
Cleveland	7.50- 8.00
Detroit	5.25- 5.75
E. Pa., chemical	10.00-12.00
New York, dealers	1.50- 1.75
St. Louis	3.25- 3.75

PIPE AND FLUES

Cincinnati, dealers	6.50- 7.00

RAILROAD GRATE BARS

Buffalo	8.50- 9.00
Chicago, net	7.50- 8.00
Cincinnati	5.50- 6.00
Eastern Pa.	9.00- 9.50
New York, dealers	5.00- 5.25
St. Louis	4.50- 5.00

FORGE FLASHINGS

Boston, dealers	5.75- 6.00
Buffalo	10.50-11.00
Cleveland	10.00-10.50
Detroit	8.00- 8.50
Pittsburgh	11.75-12.25

FORGE SCRAP

Boston, dealers	4.50- 5.00
Chicago, heavy	13.50-14.00
Eastern Pa.	11.50-12.00

ARCH BARS, TRANSOMS

St. Louis	12.00-12.50

AXLE TURNINGS

Boston, dealers	3.75- 4.25
Buffalo	10.50-11.00
Chicago, elec. fur.	12.00-12.50
Eastern Pa.	11.00
St. Louis	7.75- 8.25

STEEL CAR AXLES

Birmingham	12.00-12.50
Boston, ship. point.	10.50-11.00
Buffalo	14.50-15.00
Chicago, net	14.50-15.00
Eastern Pa.	17.00
St. Louis	12.50-13.00

SHAFTING

Boston, ship point.	13.00-13.25
Eastern Pa.	18.50
New York, dealers	13.50-14.00
St. Louis	11.00-11.50

CAR WHEELS

Birmingham	9.00- 9.50
Boston, iron deal.	6.00- 6.25
Buffalo, iron	11.00-11.50
Buffalo, steel	14.50-15.00
Chicago, iron	12.50-13.00
Chicago, rolled steel	13.00-13.50
Cincinnati, iron	10.00-10.50
Eastern Pa., iron	12.50-13.00
Eastern Pa., steel	14.50-15.00
Pittsburgh, iron	13.50-14.00
Pittsburgh, steel	15.00-15.50
St. Louis, iron	10.00-10.50
St. Louis, steel	12.00-12.50

NO. 1 CAST SCRAP

Birmingham	9.00- 9.50
Boston, No. 1 mach.	9.00- 9.25
Boston, No. 2	8.00- 8.25
Boston, tex. con.	8.50- 9.00
Buffalo, cupola	12.25-12.75
Buffalo, mach.	13.00-13.50
Chicago, agri. net	9.50-10.00
Chicago, auto	10.50-11.00
Chicago, mach. net	11.50-12.00
Chicago, railr'd net	10.00-10.50
Cinci., mach. cup	10.00-10.50
Cleveland, cupola	12.25-12.75
Detroit, net	10.00-10.50
Eastern Pa., cupola	12.50-13.00
E. Pa., mixed yard	10.50
Pittsburgh, cupola	13.75-14.25
San Francisco, del.	13.50-14.00
Seattle	7.50- 9.00
St. Louis, No. 1	9.50-10.00
St. L., No. 1 mach.	11.75-12.25

HEAVY CAST

Boston, del.	6.00- 6.25
Buffalo, break.	10.50-11.00
Cleveland, break	10.00
Detroit, No. 1, mach. net	12.00-12.50
Detroit, break.	8.50- 9.00
Detroit, auto net	11.50-12.00
Eastern Pa.	11.50-12.00
N. Y., break. deal.	7.25- 7.75
Pittsburgh	12.75-13.25

MALLEABLE

Birmingham, R. R.	11.00-12.00
Boston, consum.	13.50-14.50
Buffalo	14.50-15.00
Chicago, R. R.	15.00-15.50
Cincinnati, agri. del.	11.00-11.50
Cleveland, rail	15.50-16.00
Detroit, auto net	12.50-13.00
St. Louis, R. R.	13.00-13.50
Eastern Pa., R. R.	13.00-13.50

RAILS FOR ROLLING

5 feet and over

Birmingham	10.50-11.00
Boston, dealers	8.00- 8.50
Buffalo	12.00-12.50
Chicago	13.75-14.25
Eastern Pa.	13.00-14.00
New York, dealer	10.50-11.00
St. Louis	12.25-12.75

LOCOMOTIVE TIRES

Chicago (cut)	13.50-14.00
St. Louis, No. 1	11.75-12.25

LOW PHOS. PUNCHINGS

Buffalo	14.50-15.00
Chicago	14.50-15.00
Eastern Pa.	15.00-16.00
Pittsburgh (heavy)	15.00-15.50
Pittsburgh (light)	14.00-14.50

Iron Ore

Lake Superior Ore

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbess.	4.65

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63% con. (nom.)	8.00- 9.00
Cop.-free low phos. 58-60% (nom.)	10.00-10.50

Foreign Ore

Cents per unit, f.a.s. Atlantic ports (nominal)

Foreign manganiferous ore, 45.55% iron, 6-10% man.	10.50
No. Afr. low phos.	10.50
Swedish basic, 65%	9.50
Swedish low phos.	10.50
Spanish No. Africa basic, 50 to 60%	10.50
Tungsten, spot sh. ton unit, duty pd.	$15.50-16.00
N. F. fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	19.25

Manganese Ore

* *(Nominal)*

Prices not including duty, cents per unit cargo lots

Caucasian, 52-55%	26.00
So. African, 52%	26.00
So. Afr., 49-51%	24.00
Indian, 58-60%	nominal
Indian, 48-50%	nominal

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS	
Baltimore*	3.00c
Boston††	3.00c
Buffalo	3.00c
Chattanooga	3.31c
Chicago (j)	3.00c
Cincinnati	3.22c
Cleveland	3.00c
Detroit	3.09c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.06c
New Orleans	3.35c
New York‡(d)	3.31c
Pitts. (h)	2.95c-3.10c
Philadelphia*	3.03c
Portland	3.70c
San Francisco	3.50c
Seattle	3.70c
St. Louis	3.25c
St. Paul	3.25c-3.40c
Tulsa	3.25c
IRON BARS	
Portland	3.40c
Chattanooga	3.31c
Baltimore*	3.05c
Chicago	2.75c
Cincinnati	3.22c
New York‡(d)	3.36c
Philadelphia*	2.93c
St. Louis	3.20c
Tulsa	3.25c
REINFORCING BARS	
Buffalo	2.60c
Chattanooga	3.31c
Chicago	2.10c-2.60c
Cleveland (c)	2.10c
Cincinnati	3.25c
Houston	3.25c
Los Ang., cl.	2.45c
New Orleans	3.50c
Pitts., plain (h)	3.05c
Pitts., twisted squares (h)	3.175c
San Francisco	2.45c
Seattle	2.45c
St. Louis	3.25c
Tulsa	3.25c
Young.	2.30c-2.60c
SHAPES	
Baltimore*	3.00c
Boston††	3.19c
Buffalo	3.25c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.42c
Cleveland	3.31c
Detroit	3.42c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.31c
New Orleans	3.55c
New York (d)	3.46c
Philadelphia*	2.98c
Pittsburgh(h)	3.15c
Portland (i)	3.70c
San Francisco	3.50c
Seattle (i)	3.70c
St. Louis	3.45c
St. Paul	3.45c
Tulsa	3.50c
PLATES	
Baltimore*	3.00c
Boston††	3.21c
Buffalo	3.37c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.42c
Cleveland, ¼-in. and over	3.31c
Detroit	3.42c
Detroit, 7/16-in.	3.65c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.31c
New Orleans	3.55c
New York (d)	3.40c
Philadelphia*	2.98c
Phila. floor	4.95c
Pittsburgh(h)	3.15c
Portland	3.55c
San Francisco	3.50c
Seattle	3.55c
St. Louis	3.45c
St. Paul	3.45c
Tulsa	3.50c
NO. 10 BLUE	
Baltimore*	3.10c
Boston††	3.30c
Buffalo	3.62c
Chattanooga	3.36c
Chicago	3.05c
Cincinnati	3.22c
Cleveland	3.11c
Det., 8-10 ga.	3.14c
Houston	3.35c
Los Angeles	3.70c
Milwaukee	3.16c
New Orleans	3.55c
New York	3.31c
Portland	3.75c
Philadelphia*	3.08c
Pittsburgh(h)	2.95c
San Francisco	3.60c
Seattle	3.75c
St. Louis	3.45c
St. Paul	3.30c
Tulsa	3.70c
NO. 24 BLACK	
Baltimore*†	3.60c
Boston (g)	2.95c
Buffalo	3.25c
Chattanooga	4.21c
Chicago	3.85c
Cincinnati	4.02c
Cleveland	3.91c
Detroit	3.94c
Los Angeles	4.35c
Milwaukee	3.96c
New Orleans	4.50c
New York	3.89c
Philadelphia*†	3.60c
Pitts.** (h)	3.55c
Portland	4.40c
San Francisco	4.25c
Seattle	4.40c
St. Louis	4.10c
St. Paul	3.90c
Tulsa	4.75c
NO. 24 GALV. SHEETS	
Baltimore*†	4.30c
Buffalo	4.00c
Boston (g)	4.65c
Chattanooga	4.86c
Chicago (h)	4.55c
Cincinnati	4.72c
Cleveland	4.61c
Detroit	4.72c
Houston	4.40c
Los Angeles	4.95c
Milwaukee	4.66c
New Orleans	4.95c
New York	4.50c
Philadelphia*†	4.40c
Pitts.** (h)	4.15-4.45c
Portland	5.00c
San Francisco	5.00c
Seattle	5.00c
St. Louis	4.65c
St. Paul	4.50c
Tulsa	5.10c
BANDS	
Baltimore*	3.20c
Boston††	3.30c
Buffalo	3.42c
Chattanooga	3.61c
Chicago	3.30c
Cincinnati	3.47c
Cleveland	3.36c
Detroit, 7/8-in. and lighter	3.39c
Houston	3.25c
Los Angeles	4.10c
Milwaukee	3.41c
New Orleans	3.95c
New York (d)	3.56c
Philadelphia	3.18c
Pittsburgh (h)	3.20c
Portland	4.25c
San Francisco	4.10c
Seattle	4.25c
St. Louis	3.55c
St. Paul	3.55c
Tulsa	3.45c
HOOPS	
Baltimore	2.30c
Boston	4.30c
Buffalo	3.42c
Chicago	3.30c
Cincinnati	3.47c
Det., No. 14 and lighter	3.39c
Los Angeles	5.85c
Milwaukee	3.41c
New York	3.56c
Philadelphia	3.43c
Pittsburgh (h)	3.70c
Portland	5.60c
San Francisco	6.15c
Seattle	5.60c
St. Louis	3.55c
St. Paul	3.55c
COLD FIN. STEEL	
Baltimore (c)	3.58c
Boston	3.75c
Buffalo (h)	3.40c
Chattanooga*	3.98c
Chicago (h)	3.35c
Cincinnati	3.57c
Cleveland (h)	3.35c
Detroit	3.49c
Los Ang. (f) (d)	5.85c
Milwaukee	3.46c
New Orleans	4.15c
New York	3.81c
Philadelphia	3.61c
Pittsburgh	3.20c
Portland (f) (d)	6.00c
San Fran.(f) (d)	5.80c
Seattle (f) (d)	6.00c
St. Louis	3.60c
St. Paul	3.87c
Tulsa	4.50c
COLD ROLLED STRIP	
Boston, 0.100-in., 500 lb. lots	3.245c
Buffalo	3.39c
Chicago	3.27c
Cincinnati (b)	3.22c
Cleveland (b)	3.20c
Detroit	3.33c
New York	3.36c
St. Louis	3.45c

TOOLS STEELS

(Applying on or east of Mississippi river; west of Mississippi 1c up)

	Base
High speed	57c
High carbon, high chrome	37c
Oil hardening	22c
Special tool	20c
Extra tool	17c
Regular tool	14c

Uniform extras apply.

BOLTS AND NUTS

(100 pounds or over)

	Discount
Chicago (a)	70
Cleveland	70
Detroit	70-10
Milwaukee	70
Pittsburgh	70

(a) Under 100 pounds, 65 off.

(b) Plus straightening, cutting and quantity differentials; (c) Plus mill, size and quantity extras; (d) Minus quant. diff.; (e) New mill classif. (f) Rounds only; (g) 50 bundles or over; (h) Outside delivery, 10c less; (i) Under 3 inches; (j) shapes other than rounds, flats, fillet angles, 3.15c.

‡Domestic bars; *Plus quan. extras; **Under 25 bundles; *†50 or more bundles; †New extras apply; ††Base 40,000 lbs., extras on less.

Prices on heavier lines are subject to new quantity differentials; 399 lbs. and less, up 50 cts.; 400 to 9999 lbs., base; 10,000 to 19,999 lbs., 15 cts. under; 20,000 to 39,999 lbs., 25 cts. under; 40,000 lbs. and over, 35 cts. under base.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Nov. 7

Export Prices f. o. b. Ship at Port of Dispatch—(By Cable or Radio)

	British gross tons U. K. ports		Continental Channel or North Sea ports, metric tons	
PIG IRON		£ s d	Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Silicon	$15.38	3 2 6	$14.17	1 15 0
Basic bessemer	15.38	3 2 6*	12.95	1 12 0
Hematite, Phos. .03-.05	15.99	3 5 0	.....	.....
SEMIFINISHED STEEL				
Billets	$27.06	5 10 0	$19.02	2 7 0
Wire rods, No 5 gage	41.82	8 10 0	36.44	4 10 0
FINISHED STEEL				
Standard rails	$40.59	8 5 0	$44.53	5 10 0
Merchant bars	1.65c	7 10 0	1.15c to 1.20c	3 2 6 to 3 5 0
Structural shapes	1.62c	7 7 6	1.14c	3 1 6
Plates, †¼ in. or 5 mm.	1.76c	8 0 0	1.56c	4 5 0
Sheets, black, 24 gage or 0.5 mm	2.09c	9 10 0	2.13c	5 16 0
Sheets, gal., 24 gage, corr.	2.53c	11 10 0	2.28c	6 5 0
Bands and strips	1.87c	8 10 0	1.46c	4 0 0
Plain wire, base	2.04c	9 5 0	1.96c	5 7 6
Galvanized wire, base	2.36c	10 15 0	2.29c to 2.35c	6 5 6 to 6 7 6
Wire nails, base	2.64c	12 0 0	2.11c	5 15 0
Tin plate, box 108 lbs.	$ 4.61	0 18 9	.....	.....

British ferromanganese $85 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d ($43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d		French Francs		Belgian Francs		Reich Marks	
Fdy. pig iron, Si. 2.5	$16.61	3 7 6(a)	$17.13	260	$12.50	370	$25.36	63
Basic bessemer pig iron	17.22	3 10 0(a)	12.52	190	11.83	350	27.98 (b)	69.50
Furnace coke	4.18	0 17 0	6.26	95	3.89	115	7.65	19
Billets	27.06	5 10 0	28.34	430	18.25	540	38.85	96.50
Standard rails	1.82c	8 5 0	2.08c	694	1.65c	1,100	2.42c	132
Merchant bars	1.89c	8 12 0	1.68c	560	.90c	600	2.01c	110
Structural shapes	1.93c	8 15 0	1.65c	550	.90c	600	1.97c	107.50
Plates, †¼-in. or 5 mm.	1.99c	9 1 3	2.10c	700	1.05c	700	2.32c	127
Sheets, black	2.48c	11 5 0§	1.80c	600‡	1.24c	825‡	2.64c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	2.92c	13 5 0	3.23c	1,075	2.25c	1,500	6.77c	370
Plain wire	2.04c	9 5 0	3.15c	1,050	1.73c	1,150	3.17c	173
Bands and strips	2.06c	9 7 0	1.95c	650	1.26c	840	2.32c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel. a del. Middlesbrough. b hematite. ††Close annealed.

**Gold pound sterling carries a premium of 66.25 per cent over paper sterling.

Bars

Bar Prices, Page 82

Pittsburgh—Last week's $2 a ton advance in rerolling billets narrows the spread between semifinished steel and finished bars. Some announcement as to a bar price increase may be expected this week. In the meantime, bars are 1.85c, base, Pittsburgh, for 5 to 25-ton lots. Heavier buying from automotive interests is causing expansion in bar mill schedules.

Cleveland—Steel bar consumers are anticipating a price advance, since semifinished steel prices were raised, but so far, except in a few instances, they have not taken steps to cover forward requirements or to accumulate stocks. Sellers indicate that any change in finished steel prices probably will not become effective until first quarter, or until after consumers have been given ample time to contract. Currently, demand from automobile forge shops, nut and bolt manufacturers and miscellaneous users is strong, new bookings and shipments increasing over the October averages.

Chicago—Steel bar demand is steady but there has been no additional improvement in automotive and farm implement releases. Specifications from miscellaneous consumers are fairly steady though recession rather than improvement in demand is looked for during the balance of the year. The trade here is not inclined to expect a further advance in prices as a result of the recent increase in semifinished material.

Boston—Steel bar releases are steady with a fair volume of spot buying, small lots for quick delivery at 1.85c, Pittsburgh. While demand is well spread, forging and alloy bars are relatively most active.

New York—Bar inquiry has been fairly sustained at a moderate rate, and with current talk of higher prices for next quarter increased activity over the next few weeks may develop. Further, actual consumption is expanding, with consumers drawing on stocks previously laid in.

Philadelphia—Commercial steel bar tonnage is only fair, although possibility of higher prices next quarter may stimulate consuming interest later. Meanwhile, cold finishers and certain other consumers, are expanding operations, but drawing mostly on stocks laid in before Oct. 1, when the new quantity extras and deductions went into effect.

Youngstown, O.—Demand for steel bars is growing in volume, coming from a variety of consuming sources. Immediate shipment is required which indicates that little buying is speculative on the threat of higher prices. Shipments also continue to gain.

Plates

Plate Prices, Page 82

Pittsburgh—A large order for river barges is pending, with promise of reaching the contract stage shortly. American Bridge Co., Pittsburgh, has received an order for 570 tons of plates and shapes for wall armor for the Pickwick Landing dam for the Tennessee valley authority. Plates are unchanged at 1.80c, base, Pittsburgh.

Cleveland—Plate bookings in the aggregate are not as large as a month ago, although boiler shops are showing some improvement, and fabricators of small tanks are fairly active, placing small orders regularly. For Great Lakes vessel repairs 3500 tons of plates will be placed shortly and specifications are expected out soon for an 11,000-foot 30-inch electrically welded water main for Cleveland, requiring about 1000 tons of plates. Prices are steady.

Chicago—Plate mills look to the railroads to provide increased business over coming months and support the relatively quiet demand from building construction and miscellaneous users. Fair tonnages are being taken for public construction, though only three more Mississippi river dams are in prospect and a request for bids for these has not been made.

Boston—Plate inquiry is heavier, also purchasing for tank needs. Pittsburgh-Des Moines Steel Co. has been awarded two tanks for Eastport, Me., taking more than 100 tons. Miscellaneous demand is steady and in the aggregate substantial. There is also a better industrial demand for plates. Most buying is for immediate delivery. Most boiler shops are slightly more active. Prices are unchanged at 2.22c, Boston.

New York—Miscellaneous plate tonnage is expanding, with talk of higher prices having a stimulating influence in some lines. Attracting principal attention at the moment is the International Mercantile-Roosevelt Steamship Co. liner on which bids go in Nov. 12. This ship will take about 15,000 tons of hull steel, of which close to two-thirds will be placed.

Possibility that higher finished steel prices may be effective before the end of the year is causing many consumers to contract for the remainder of the quarter and to seek protection on identified projects. General belief is that an advance on plates probably will not be more than $1 per ton, though definite assurance is not given. General disposition of consumers not to carry heavy inventories into the new year may retard actual releases, particularly if the increase is more than $1.

Philadelphia—Higher prices on plates, probably effective Jan. 1, appear almost assured. Increases in semifinished material, including skelp, of $2 a ton are expected to be put into early application in the East, following recent action in the Pittsburgh and middlewestern districts, and this, combined with prospects of increased costs in other directions, is expected to be reflected in an advance in plates. The market at present is 1.90c, Coatesville, Pa., or 1.99½c, Philadelphia. Central Iron & Steel Co., Harrisburg, Pa., has booked a tonnage for the navy and is low on other navy work which may bring the total to about 7000 tons. Bids will be opened in New York this week on a steamer for the International Mercantile Marine-Roosevelt Steamship Co., requiring approximately 15,000 tons of steel, principally plates. Miscellaneous plate demand is expanding slightly, but is still spotty.

Seattle—A. M. Castle & Co., Seattle, booked 135 tons for a river craft for the army engineers, Portland, Oreg., general contract held by Lake Washington Shipyards, Seattle. The concrete section of the Tacoma Green river gravity line will need about 300 tons of wire mesh, general contract to American Concrete Pipe Co., Tacoma, Wash. Demand for light gages for repair work is reported brisk by jobbers.

San Francisco—Plate bookings are limited to less than carload lots. Plate fabricators were greatly disappointed when the metropolitan water district, Los Angeles, on an inquiry for 10,620 tons of welded steel pipe or reinforced concrete pipe, awarded the general contract on the latter basis.

Contracts Placed

570 tons, plates and shapes, wall armor, Pickwick Landing dam, for Tennessee valley authority, Knoxville, Tenn., to American Bridge Co., Pittsburgh.

520 tons, 1,000,000-gallon elevated water tank, Newport News Water Co., Phoebus, Va., to Chicago Bridge & Iron Works, Chicago.

110 tons, four dump scows, each 100 x 26 x 6½ feet, United States engineer, Pittsburgh, to Ingalls Iron Works, Birmingham, Ala.

335 tons, 15 small tanks, Tide Water Oil Co., Bayonne, N. J., to Chicago Bridge & Iron Works, Chicago.

195 tons, two 15-ton whirler derrick boats, United States engineer, Huntington, W. Va., to Treadwell Construction Co., Midland, Pa.

140 tons, tanks, Petroleum Refinery Inc., Wyandotte, Mich., to Buffalo Tank Corp., Buffalo.

135 tons, steel hull for United States engineers, Portland, Oreg., to A. M.

Castle & Co., Seattle; general contract by Lake Washington Shipyards, Seattle.

100 tons or more, two elevated water storage tanks, tidal power project, United States engineer, Eastport, Me., to Pittsburgh-Des Moines Steel Co., Pittsburgh, $15,700, alternate bid, Oct. 24. Chicago Bridge & Iron Works, Chicago, second with lump sum bid, both items, $18,200.

Unstated tonnage, steel stack, 6 x 125 feet, United States engineer, tidal power project, Eastport, Me., to Lancaster Iron Works, Lancaster, Pa., bids Oct. 25; Nagle Engine & Boiler, Erie, Pa., awarded four steam boilers, opening of Oct. 24.

Contracts Pending

3500 tons, miscellaneous repairs to Great Lakes vessels.

1000 tons, for 11,000-foot, 30-inch electrically welded watermain, Cleveland; bids soon.

1350 tons, 28-inch land pipe for Fort Peck dam, Montana; bids opened.

500 to 700 tons, 10 to 16-inch welded steel pipe, St. George, Utah; Utah Welding Co. low.

383 tons, tubing, pipe, penstock and outlet materials, Seminole dam project, Wyoming; bids at Casper, Wyo., Nov. 26.

250 tons, for 35-ton derrick boat; bids Nov. 7 by United States engineer, New York.

208 tons, steel liner plates, Casper-Alcova, Wyoming, project; bids at Casper, Wyo., Nov. 25.

170 tons, for 300,000-gallon standpipe and tower for Madison Heights sanitary district, Amherst county, Virginia; bids Nov. 19.

160 tons, 300,000-gallon standpipe at Rockymount, Franklin county, Va.; bids Nov. 15.

120 tons, 250,000-gallon standpipe and foundations at Athol, Mass.; bids Nov. 18.

100 tons or more, standpipe, Northbridge, Mass.; bids in.

Unstated tonnage, standpipe, Millis, Mass., taking bids.

Transportation

Track Material Prices, Page 83

Award of 20,000 tons of rails for prompt delivery, made by the Louisville & Nashville to the Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., brings the backlog of that producer to 33,000 tons and caused it to start rolling at its Ensley, Ala., mill Nov. 7. Rail producers in the Chicago district are awaiting requests for bids on a total of about 40,000 tons of rails for western roads and present commitments probably will keep rail mills busy to the end of the year, with 1936 requirements yet to come.

Coincident with its purchase of a stainless steel chair car from the Edward G. Budd Mfg. Co., Philadelphia, the Atchison, Topeka & Santa Fe has placed an order with the St. Louis Car Co., St. Louis, for a similar car, to be fabricated of Cor-ten steel.

Chicago, Burlington & Quincy will build three locomotives in its own shops, in addition to the 1250 freight cars already announced for construction immediately after the first of the year, also in its own shops.

It appears likely the Pennsylvania will build about half its 10,000 new freight cars in its own shops and let the remainder to outside carbuilders. Reclaimed trucks, axles, wheels and underframes will be used as far as possible.

Bessemer & Lake Erie has completed welding of rails on about a mile of track near Pittsburgh.

Freight car awards in October totaled 1250, being the cars to be built by the Chicago, Burlington & Quincy in its own shops. This brings the total awards for the year to 9158 cars. Comparisons are presented in the accompanying table:

	1935	1934	1933	1932
Jan.	24	152	3	159
Feb.	806	19,725	0	35
March	0	30	5	105
April	350	800	50	0
May	2	717	8	60
June	5,151	1,835	500	0
July	500	19	306	25
Aug.	200	105	202	5
Sept.	875	7	23	1,298
Oct.	1,250	75	514	0
10 Mo.	1,958	23,465	1,611	1,747
Nov.		254	533	2
Dec.		110	316	50
Total		23,829	2,460	1,739

Car Orders Placed

Atchison, Topeka & Santa Fe, one de luxe Cor-ten steel chair car, to St. Louis Car Co., St. Louis; in addition to stainless steel car to Edward G. Budd Mfg. Co., Philadelphia, noted last week.

Locomotives Placed

Chicago, Burlington & Quincy, three 4-8-4 type freight locomotives, to its West Burlington, Iowa, shops; this and 1250 freight cars to be built in the company's own shops total $3,000,000.

Rail Orders Placed

Louisville & Nashville, 20,000 tons, to Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

Locomotives Pending

Lehigh & New England, one 0-6-0 type switch engine, contemplated.

Cold Finished

Cold Finished Prices, Page 83

Pittsburgh—Cold-finished steel bar producers probably will defer announcement on price increases until later in the quarter, with the $2 a ton advance in semifinished steel definitely forecasting a higher price for cold-finished bars. Meanwhile 1.95c, base, Pittsburgh, continues. On the strength of advancing automotive assembly schedules, the market is more active.

Sheets

Sheet Prices, Page 82

Pittsburgh — Heavier automotive sheet buying, and strong demand for sheets for stoves and roofing, and miscellaneous uses, have lifted the rate of current production for the sheet industry to 70-75 per cent. Furthermore, the possibility that sheet prices will be advanced is favoring slightly more long-term buying. Heavy galvanized sheet business is noted, due to continuation of favorable weather for rural roofing repair work.

Cleveland — Sheet mills continue to increase backlogs, with operations at Cleveland at capacity, and in an adjacent lake district, 80 per cent. Some producers cannot deliver full-finished sheets before the third week of December. While this is due mainly to enlarged orders from automobile manufacturers, demand for enameling stock for various purposes has been heavy. Plain black sheets are available from mills for prompt shipment. As sheet bars have been advanced $2 a ton, sellers expect an increase in sheet prices, which, however, may not go in effect until Jan. 1.

Chicago—Sheet demand has been stimulated by fears of consumers that the recent increase in quotations on sheet bars will be reflected in higher sheet prices. While producers anticipate that some increase will be made, the extent has yet to be determined. Sheet mills are rushed to accommodate demand already active as a result of heavier requirements of the automotive industry, and well sustained consumption by other leading users.

Boston—Shipments are steady, but new buying and releases have declined slightly. Demand continues well diversified. Volume in galvanized has been somewhat disappointing, although small tank requirements have held up well. Prices are unchanged.

New York—New sheet business here has not been stimulated by talk of higher prices, which may become effective Jan. 1. Meanwhile, shipments are brisk.

Philadelphia—The next week or 10 days may see considerable activity in sheets, with higher prices practically assured and with deliveries becoming more extended. In the absence of any official announcements, it appears likely that finished sheets will be advanced $2 a ton, and possibly higher on certain grades, effective Jan. 1. Deliveries on hot rolled

sheets are extended three weeks, and beyond in a number of cases, and cold finished sheets in general are offered at four to five weeks. Specifications are brisk. The Apollo Steel Co., Apollo, Pa., the Wheeling Corrugating Co., Wheeling, W. Va., the Newport Culvert Co. Inc., Newport, Ky., appear likely to share the 2500 tons of culvert pipe for the state of Pennsylvania. Bethlehem Steel Co., Bethlehem, Pa., was awarded on a draw 210 tons of pickled sheets to be fabricated into automobile license tags at the western state prison, Pittsburgh.

Youngstown, O.—The recently announced advance of $2 a ton effective immediately in the prices of sheet bars and slabs as well as billets by valley makers, following like advances named at Pittsburgh, has the various district nonintegrated sheet mills guessing and grumbling. They claim their margin of profit, previously slim enough, has been practically swept away. Some producers now are talking of a possible sheet price rise of $3 to $5 a ton, since mill production costs have been pyramiding in the past several months. New business is coming to mills from all directions, with the insistent demand for practically immediate shipment. Backlogs now extend for two to three weeks.

Cincinnati — Continued talk of higher prices, emphasized by recent advances in sheet bars and pig iron, has led to sheet buying for more extended needs. Mills are not accepting orders for first quarter delivery. Releases from automobile manufacturers sustain shipments near mill capacity. Demand for enameling sheets is heavy.

St. Louis—New orders and shipments of steel sheets are steady, with some grades showing moderate improvement. Roofing interests have supplemented their stocks by reordering. Galvanized demand averages about as good as in October. The leading producer is operating slightly higher than 50 per cent.

Birmingham, Ala.—Shipments are equal to production with orders in hand sufficient to sustain a steady rate of production.

Pipe

Pipe Prices, Page 83

Pittsburgh—Producers of tubular products have taken no action toward revision of discounts on all grades of pipe, in spite of the announcement of a $2 a ton advance in skelp which was made last week. That some revision in pipe discounts will be made in the near future appears a foregone conclusion. Orders for pipe are showing

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P-103

Write for Bulletin 301

MICHIGAN LEATHER PACKING CO.
720 Fourteenth Avenue, Detroit

slight improvement, but lack any individual purchases of size.

Chicago—Orders for small lots of cast pipe are heavier, but few awards of large tonnages are noted. Most business is for work financed by federal funds and an increase in such bookings is in prospect. Chicago is taking bids on 493 tons of 12-inch. While action has yet to be taken on price changes to compensate producers for the recent advance in pig iron, this move is expected to be made soon.

Boston — While still disappointing in volume, cast pipe inquiry is slightly heavier. Northbridge, Mass., has bids on close to 400 tons while small miscellaneous lot buying shows some gain. Merchant steel pipe moves in steady volume sustained by slowly mounting building requirements.

New York — Cast pipe inquiry is substantially heavier, several thousand tons being up for quotations in this district, including close to 1000 tons for Ocean Gate, N. J. Buying is light, however, with small fill-in lots predominating. Cast pipe prices are fairly steady.

Philadelphia—Higher prices on tubular goods are indicated by the stronger tone in skelp, which has already been advanced $2 a ton by some of the midwestern producers. Incidentally, tube makers in this district appear to have little skelp on hand, with a result that substantial orders are now being placed pending an increase in the East.

Youngstown, O.—What with jobbers expanding their stocks of wrought pipe and additional orders coming to mills from a variety of sources, the merchant pipe trade is fairly brisk. Line pipe requirements are slow in arriving at the contract stage, but demand for oil well supplies are furnishing additional pressure upon the mills for deliveries. Prospects are declared to be very promising for all grades.

San Francisco — Pickup in demand for cast pipe is marked and inquiries are now more numerous than at any other time during the past year. Over 20 cities in Utah have called for bids for water improvement projects under PWA, aggregating a federal expenditure of more than $500,000. Beverly Hills, Calif., has opened bids on 560 tons of 6 to 12-inch, class 150 pipe.

Seattle — The largest tonnage pending in this area is in excess of 800 tons for Corbett, Ore., for a $53,000 water system improvement. New bids have been called for Nov. 15. Specifications call for 3 to 8-inch pipe. Wrangell, Alaska, has awarded to local contractors about 100 tons of small diameter pipe.

Cast Pipe Pending

1000 tons, 10-inch and under with fittings, Ocean Gate, N. J.; bids in.
800 tons, 3 to 8-inch, water pipe, Corbett, Oreg.; bids Nov. 15.
650 tons, 12-inch and under, with fittings, water system, Madison Heights sanitary district, Amherst county, Va.; bids Nov. 19.
560 tons, 6 to 12-inch, Beverly Hills, Calif.; bids in.
493 tons, 12-inch, Chicago; bids Nov. 15.
485 tons, 6 and 10-inch, Latham Water district, Colonie, N. Y.; bids Nov. 14.
275 tons, 6 and 8-inch, Sturbridge, Mass.; bids in.
161 tons, 4 to 8-inch, Lewiston, Idaho; bids in.
160 tons, 12-inch, watermain, Nyack, N. Y.; bids Nov. 21.
147 tons, 4-inch, class 250, Bloomington, Idaho; bids in.
136 tons, 2 to 6-inch, Oakley, Utah; bids Nov. 21.
131 tons, 2 and 4-inch Brigham City, Utah; bids Nov. 23.
125 tons, 12-inch, sewer, Cornwall, N. Y.; bids Nov. 15.
125 tons, 18-inch, trunk sewer, Westchester county, section J, Blind Brook, N. Y., project; bids Nov. 22.
100 tons, Eureka City, Utah; bids in.

Strip Steel

Strip Prices, Page 83

Pittsburgh—No change has been announced for hot strip at 1.85c, Pittsburgh, or cold strip at 2.60c, Pittsburgh or Cleveland, following the $2 a ton rise in semifinished steel last week. Most nonintegrated strip steel producers are protected over the remainder of the quarter and consequently will not announce price increases on finished strip immediately. The market is still active and hot-strip mills are running at 50 per cent of capacity, mainly on business for prompt shipment, with cold-strip mills operating higher at 55 per cent.

Cleveland — Specifications from automobile manufacturers and partsmakers are increasing steadily, giving mills larger backlogs. The Cleveland strip mill is operating at 60 per cent.

Chicago—Strip consumers are concerned over the possibility of higher prices as a result of the increase in semifinished steel, and some buying has developed in anticipation of such a move. In addition requirements of the automotive industry are increasing, while demand from miscellaneous consumers is holding well.

Boston — Cold-strip operations in some mills average close to 80 per cent and for the district are estimated at close to 70 per cent as incoming volume is well maintained. Most specifications are for early delivery but individual orders tend to be larger. Some consumers are anticipating requirements moderately against a possible price advance. Demand is widely spread with automotive accessory makers taking slightly larger shipments. Cold strip prices are firm at 2.80c, Worcester.

Philadelphia—Strip is moving in fair volume, with the probability of an increase now that higher prices appear likely for next quarter. The current market is 1.85c, Pittsburgh, or 2.16c, Philadelphia, for hot strip, and 2.60c, or 2.91c for cold strip.

Youngstown, O.—Strip mills are increasing operating schedules, both hot and cold-rolled. Good specifications continue to be received from automotive builders and partsmakers. In some instances, mills have accumulated backlogs for three weeks' operations, particularly on narrower widths.

Wire

Wire Prices, Page 83

Pittsburgh—Specifications for manufacturing wire continue brisk. Plain manufacturing wire holds at 2.30c, base, Pittsburgh or Cleveland; spring wire, 2.90c; and common wire rods, $38 a ton. Merchant wire products appear to be picking up in volume, a contraseasonal movement.

Cleveland—Demand for manufacturers' wire increased about 10 per cent last week from the preceding week. Jobbers' demand is fairly strong. Although wire rod prices had not been advanced late last week, with other semifinished steel quotations, makers expect this to be an early development, along with wire.

Chicago—Automotive wire requirements are expanding and with demand from miscellaneous consumers well maintained, activity in this market continues relatively brisk. Demand for wire products still is spotty but fair in the aggregate. Prices generally are steady.

Boston—Manufacturers' wire and specialties, the latter entering into numerous miscellaneous consumer products, are in active demand, early delivery being specified for most shipments. Merchant steel wire products move slowly. There has been some slight gain in rope buying. Prices are firm and unchanged.

New York—Demand for manufacturer's wire shows improvement, with sellers generally expressing satisfaction over the volume of specifications. Talk of advances on the prices of finished steel around the first of the year includes wire products, but estimates vary as to what the increases might be.

Though an advance in wire rods has not been announced it is believed they will rise with other semifinished steel as well as wire products.

Philadelphia—Wire specifications are better than seasonal, with continued good requirements from the Southwest and with demands for manufacturers' wire expanding for fourth consecutive week, according to some sellers.

Shapes

Structural Shape Prices, Page 82

New York — Heavier structural steel awards are more than matched by new inquiry, the largest project on the active list being a 12,000-ton section, west side elevated highway, Manhattan, closing Nov. 20. Following the award of close to 8000 tons for public schools, New York, bids close on the general contracts this week for two additional structures, taking 3000 tons. Bridge needs also are heavier, notably New York state highway spans. For the New Jersey approach, Hudson river midtown tunnel bids are in taking 3445 tons, including structural steel, liner plates and roadway beams.

Pittsburgh — American Bridge Co., Pittsburgh, has formally entered contract on 5400 tons for the Triboro bridge approach, New York, as recently noted in STEEL. Other outstanding contracts of the past week include 5580 tons in transmission towers for the Los Angeles metropolitan water authority, and 3770 tons for the Franklin K. Lane high school, Brooklyn, N. Y., both of which have been placed with McClintic-Marshall Corp., Bethlehem, Pa. McClintic-Marshall Corp. also has been awarded 2500 tons for a federal court house at Buffalo. New structural inquiry is light. The market on plain structural material holds at 1.80c, Pittsburgh.

Chicago—Structural inquiries are lighter while awards continue few despite a moderate increase in tonnage involved. Bookings include 1125 tons of piling for the Cairo, Ill., levee wall. A fairly large tonnage is pending for state bridges, with several thousand tons additional for Illinois grade separation work expected to come up for bids during the next six weeks.

Cleveland—Fabricators are busy figuring many small industrial plant alterations. The volume of this business has held up exceptionally well. Factories apparently are undergoing a gradual process of redevelopment. Also, this is indicated on a nationwide scale by the fact that STEEL's weekly reports of structural shape awards for industrial and commercial buildings so far this year show about 20 per cent gain over the comparable period in 1934. Except for these small jobs, in this district work currently is restricted mainly to railroad bridges and repairs. For a grade elimination at Monroeville, O., 150 tons were awarded Fort Pitt Bridge Works, Pittsburgh.

Boston—Structural steel inquiry improves gradually with new work coming out somewhat in excess of current awards. Bids are in on a 450-ton bridge at Waltham, Mass. Structural shops generally have more work on the books, notably for the smaller units. The largest share of tonnage being figured or pending is for public works.

Philadelphia — The structural trade here looks for an increase in shape prices to become effective Jan. 1. At present the market is 1.90c, Bethlehem, Pa., or 2.01½c, Philadelphia. The prospect of higher prices will undoubtedly stimulate struc-

Shape Awards Compared

	Tons
Week ended Nov. 9	21,750
Week ended Nov. 2	23,041
Week ended Oct. 26	10,721
This week, 1934	14,118
Weekly average, 1934	16,284
Weekly average, 1935	14,687
Weekly average, October	18,957
Total to date, 1934	751,630
Total to date, 1935	760,937

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tural demand over the remainder of this year, a demand that already is undergoing some expansion, notwithstanding a lack of substantial orders in the past week.

Camden, N. J., has voted in favor of a municipal light plant, cost not to exceed $10,000,000. Federal funds will be used.

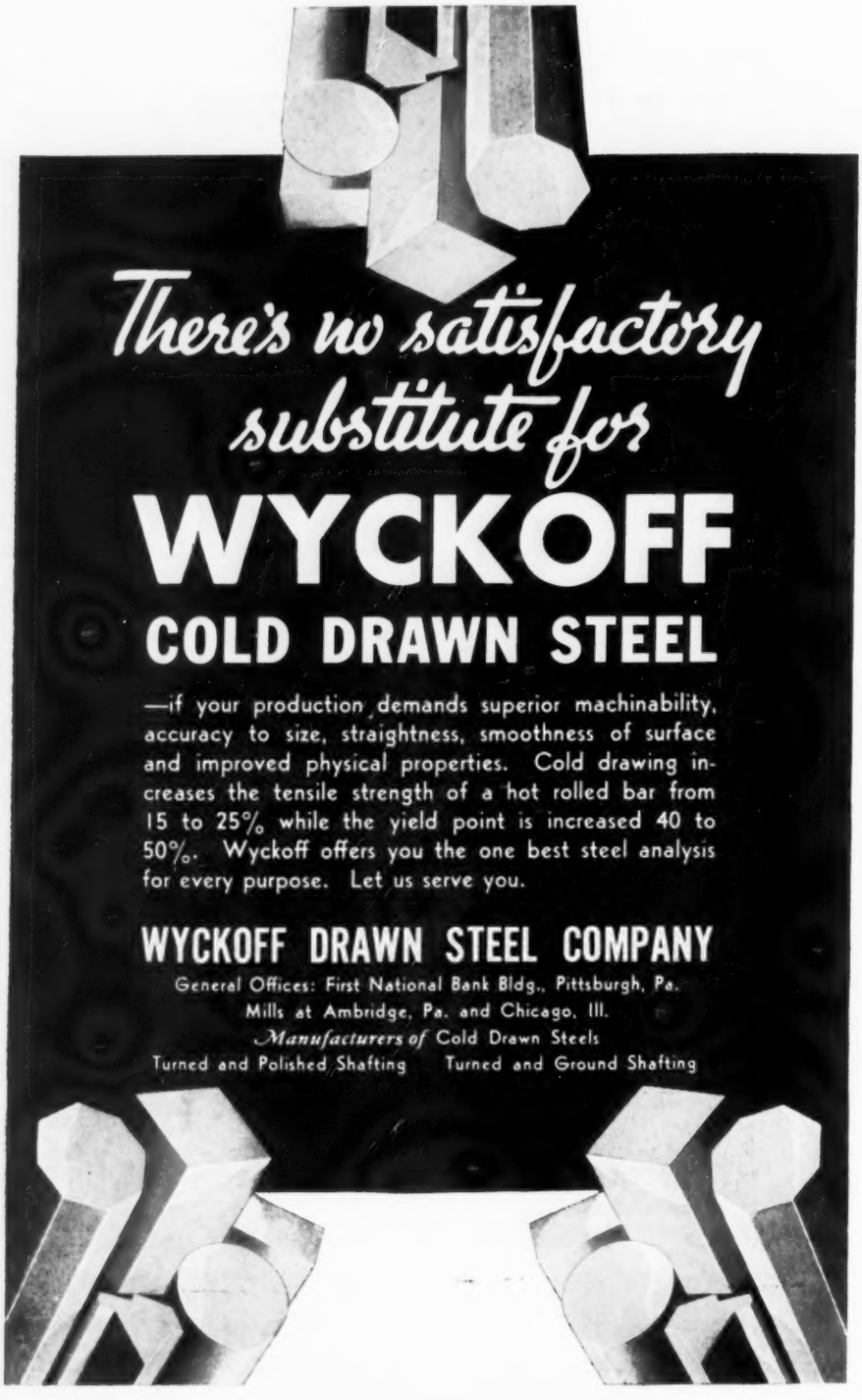
Washington — The reclamation service will receive bids Nov. 21 at Yuma, Ariz., for large quantities of iron and steel for the Imperial dam and desilting works, at the All-American canal system, Boulder canyon project, as follows: 2690 tons of steel sheet piling; 9000 tons reinforcing bars; 210 tons jet pipe; 190 tons of structural steel; 1200 tons of gates and hoists; 400 tons metal trash rack; 100 tons metal hand rails; 700 tons of metal pipe, and 71,000 feet of metal conduit.

Birmingham, Ala. — Fabricating shops maintain a fairly good rate of operations. Virginia Bridge & Iron Co. has been awarded contracts for gates and valves for Tennessee river development work at Norris and Pickwick Landing dams, by the Tennessee valley authority, requiring more than 2100 tons of steel.

Buffalo — Public service commission here has approved plans for the $717,000 grade crossing elimination project of Lehigh Valley and other railroads crossing Tifft street in Buffalo, requiring a substantial though unestimated, tonnage of steel.

San Francisco—Close to 2000 tons of shapes were placed during the week, bringing the aggregate for the year to 103,984 tons, compared with 109,914 tons for the corresponding period in 1934. Larger lettings included 430 tons of sheet piling for Wilson Cove, San Clemente, Calif., in the twelfth naval district, San Diego, placed with Columbia Steel Co., and 400 tons for a state bridge in Clearwater county, Idaho.

Seattle—New projects are developing rapidly and important tonnages are up for figures. Bids were opened Nov. 6 for two 300-ton cranes for the Bonneville, Oreg., dam, involving 1500 tons. Award of 420 tons of shapes for the Bonneville powerhouse superstructure, general contract to General-Shea Co., has not yet been announced. Requirements for the Seminole dam, bids at Casper, Wyo., Nov. 26, include 767 tons of needle valves and miscellaneous metal, 501 tons of steel for gates and appurtenances, and 90 tons of bridge steel.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Shape Contracts Placed

2500 tons, United States court house, Buffalo, N. Y., to McClintic-Marshall Corp., Bethlehem, Pa.; John W. Cowper Co., Buffalo, general contractor, bids Oct. 18.

2025 tons, bridge, Camden county, Missouri, to Stupp Bros. Bridge & Iron Co., St. Louis.

1400 tons, structural and pipe shops, navy yard, Charleston, S. C., to Belmont Iron Works, Philadelphia.

1125 tons, piling, levee wall, Cairo, Ill., to Carnegie-Illinois Steel Corp., Pittsburgh.

1110 tons, viaduct, Polk county, Iowa, to Pittsburgh-Des Moines Steel Co., Des Moines, Ia.

804 tons, state highway bridge, Seminole county, Oklahoma, to McClintic-Marshall Corp., Bethlehem, Pa.; Keliher Construction Co., Dallas, Tex., general contractor.

670 tons, four warehouses, Ludlow Mfg. Co., Edge Moor, Del., to Roy A. Robinson, Baltimore.

665 tons, bridge FAP 330E, Cherokee-Wagoner counties, Oklahoma, to Virginia Bridge & Iron Co., Roanoke, Va.

640 tons, drum gates, Norris dam, for Tennessee valley authority, Knoxville, Tenn., to Virginia Bridge & Iron Co., Roanoke, Va.

590 tons, Eagle Creek bridge, Multnomah county, Oreg., to Poole & McGonigle, Portland, Oreg.

553 tons, rolled steel armor, anchor straps and bolts, Pickwick Landing lock, Tennessee valley authority, Knoxville, Tenn., to American Bridge Co., Pittsburgh. Awards of 298 tons of steel and iron castings for same project to Blaw-Knox Co., Pittsburgh, and Pittsburgh Steel Foundry Corp., Glassport, Pa.

480 tons, building, Speed, Ind., for Louisville Cement Co., to McClintic-Marshall Corp., Bethlehem, Pa.

450 tons, superstructure, steel stringer bridge over Boston & Maine railroad, Main street, Waltham, Mass., to Boston Bridge Works Inc., Cambridge, Mass.; bids Nov. 5, department of public works, Boston, Mass.

430 tons, sheet piling, Wilson Cove, San Clemente, Calif., for twelfth naval district, San Diego, to Columbia Steel Co., San Francisco.

410 tons, state highway bridge, Ahsahka, Idaho, to McClintic-Marshall Corp., Bethlehem, Pa.

385 tons, Corpus Christi school, New York, to Jones & Laughlin Steel Corp., Pittsburgh; through O'Reilly Construction Corp.

380 tons, spillway bridge, Coal Creek, Tenn., for Tennessee valley authority, Knoxville, Tenn., to McClintic-Marshall Corp., Bethlehem, Pa.

365 tons, two municipal bridges, Colorado Springs, Colo., to American Bridge Co., Pittsburgh, Pa.

350 tons, cement plant, Louisville, Ky., to McClintic-Marshall Corp., Bethlehem, Pa.

325 tons, school, Lansingburg, N. Y., to McClintic-Marshall Corp., Bethlehem, Pa.

320 tons, miscellaneous material, building, Koppers Construction Co., Detroit, to Babcock & Wilcox Co., New York.

310 tons, school, Lansingburg, N. Y., to McClintic-Marshall Corp., Bethlehem, Pa.

300 tons, plant building, Allis-Chalmers Mfg. Co., LaCrosse, Wis., to Worden-Allen Co., Milwaukee.

300 tons, postoffice, Tallahassee, Fla., to Ingalls Iron Works Co., Birmingham, Ala.; H. W. Beers, Atlanta, Ga., general contractor. Southern General Fireproof Co., Atlanta, awarded 77 tons of reinforcing steel.

280 tons, state highway bridge, Wiggins, Colo., to McClintic-Marshall Corp., Bethlehem, Pa.

275 tons, grade separation, Lansing, Mich., to R. C. Mahon Co., Detroit.

270 tons, highway bridge, Chappell, Mont., to Virginia Bridge & Iron Co., Roanoke, Va.

250 tons, state highway bridge, Lafayette, Ind., to McClintic-Marshall Corp., Bethlehem, Pa.

230 tons, factory building, Kearny, N. J., to Savary & Glaeser, New York.

230 tons, building Baldwin Rubber Co., Pontiac, Mich., to Palmer-Bee Co., Detroit.

225 tons, Blanco bridge, highway No. 2, Hays county, Texas, to Virginia Bridge & Iron Co., Birmingham, Ala.; H. B. Zachary, Laredo, Tex., general contractor.

210 tons, plate girder bridge, Palo Alto county, Iowa, to Pittsburgh-Des Moines Steel Co., Des Moines, Ia.

200 tons, bridge, Clarksburg, W. Va., to Wisconsin Bridge & Iron Co., Milwaukee.

190 tons, postoffice, Perth Amboy, N. J., to Selbach-Meyer Co., West New York, N. J.; through E. M. Johnson.

185 tons, bridge FAP 406-D, Texas county, Oklahoma, to Capital Steel & Iron Co., Oklahoma City, R. R. Tway, general contractor.

175 tons, laboratory building, Wilson & Co. Inc., Chicago, to New City Iron Works, Chicago.

170 tons, bridge No. 9 R-E, Larimer county, Colorado, to Midwest Steel & Iron Co., Denver.

160 tons, pier No. 1, Baltimore, to Steel Fabricating Co., Baltimore.

160 tons, 16 beam spans, Missouri Pacific railroad, Durand, Kans., to Missouri Bridge & Iron Co., St. Louis.

150 tons, brewery building, Milwaukee, to Worden-Allen Co., Milwaukee.

150 tons, bridge Camby, Oreg., to Wisconsin Bridge & Iron Co., Milwaukee.

150 tons, New York Central and Wheeling & Lake Erie grade elimination, Monroeville, O., to Fort Pitt Bridge Works, Pittsburgh.

150 tons, highway bridge, Tilford, S. Dak., to McClintic-Marshall Corp., Bethlehem, Pa.

140 tons, state highway bridge, Hartwell, Nebr., to American Bridge Co., Pittsburgh.

130 tons, postoffice, New Brunswick, N. J., to Breen Iron Works, Newark, N. J.; through Milliment Construction Co.

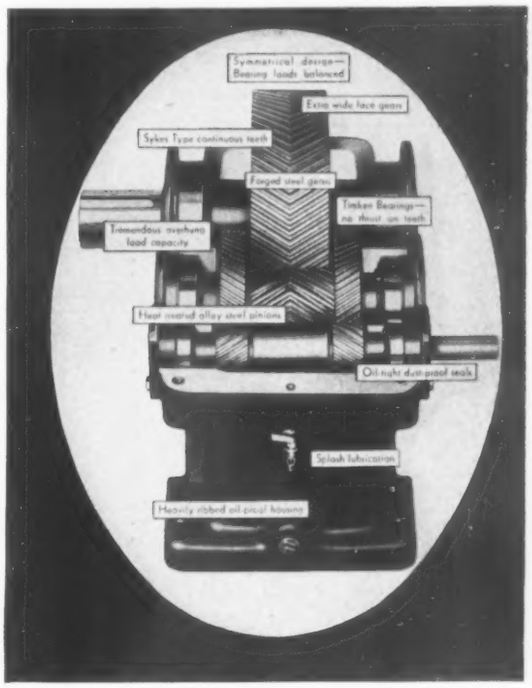
130 tons, library and administration building, Rhode Island state college, Kingston, R. I., to Bethlehem Fabricators Inc., Bethlehem, Pa.

120 tons, school, West Park, N. Y., to Schacht Steel Construction Co., New York.

115 tons, highway bridge X1-13-10-12, Battle Creek, Mich., to R. C. Mahon Co., Detroit.

110 tons, building, Eagle Pitcher Lead Co., Cincinnati, to Oregonia Bridge Co., Lebanon, O.

108 tons, state highway bridge RC 3637, Washington county, New York, to Lackawanna Steel Construction Corp.,



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Buffalo; Columbia Bridge Co., Ancram, N. Y., general contractor, Albany Steel & Iron Supply Co., Albany, awarded reinforcing steel.

100 tons, bridge 79 TR-1C PWA 76, Pike county, Missouri, to Vincennes Bridge Co., Vincennes, Ind.

100 tons, postoffice, station H, West 104th street, Manhattan, New York, to Dreier Iron Works, New York; through Caulway Inc.

Shape Contracts Pending

12,000 tons, west side elevated highway, Forty-third to Fifty-ninth street, Manhattan, New York; bids Nov. 20.

3445 tons, including structural steel liner plates and roadway beams, New Jersey approach to Manhattan-Weehawken Hudson river tunnel; George M. Brewster & Son Inc., Bogota, N. J., low.

2000 tons, public school 49, Brooklyn, N. Y.

1500 tons, two 300-ton cranes, Bonneville, Oreg., dam; bids in.

1358 tons, gates, needle valves, bridge material and miscellaneous, Seminole dam project, Wyoming; bids at Casper, Wyo., Nov. 26.

900 tons, public school 164, Queens, N. Y.

820 tons, state highway bridge, Marble Falls, Tex.

750 tons, highway bridges, Montana.

600 tons, building for University of Cincinnati, Cincinnati.

483 tons, state crossing, El Cerrito, Calif.; bids opened.

450 tons, postoffice and court house, Waco, Tex.; E. L. Martin Inc., Dallas, Tex., low on general contract.

400 tons, sewage disposal plant, Niagara Falls, N. Y.

400 tons, Erie railroad grade elimination, Olean, N. Y.; bids being taken by New York state highway department, Albany.

350 tons, building, Rhode Island School of Design, Providence, R. I.

330 tons, armory construction at four points in New Jessey; bids to be opened in Trenton, Nov. 21.

329 tons, state underpass, Salinas, Calif.; bids opened.

300 tons, highway bridges, Illinois.

300 tons, building, Ft. McClellan, Ala.

225 tons, grade crossing, Erie railroad, Endicott, N. Y.

200 tons, tunnel supports, Casper Alcova project, Wyoming; bids at Casper, Wyo., Nov. 25.

150 tons, municipal power plant, to be financed by PWA funds, Vineland, N. J.; bids asked.

150 tons, postoffice and court house, St. Augustine, Fla.; James J. Barnes, Springfield, O., low on general contract, Nov. 6.

138 tons, crossing near Beaumont, Riverside county, California; bids Nov. 21.

110 tons, crane runways, specification 1806, Los Angeles; Consolidated Steel Corp., Los Angeles, low.

107 tons, state crossing, San Jose, Calif.; bids Nov. 21.

100 tons, approximately, plant addition, Henry Disston & Sons, Philadelphia.

Unstated tonnage, 11 schools, Philadelphia; bids to be opened Dec. 10, according to board of education authorities; these are in addition to two projects on which bids were opened here Nov. 9.

Unstated, steel sheet piling, hydroelectric project, Spokane; bids Dec. 5.

Unstated, ½-inch sheet piling, bridge repairs, Coulee, Wash., dam.

Unstated, River street viaduct, Tacoma, Wash.; bids soon.

Unstated tonnage, for United States' bridges en route of Inter-American highway in Central America, for which congress appropriated $1,000,000; program officially approved by President Roosevelt.

Behind the Scenes with STEEL

Missing Link

WHO is this fellow "Average Reader" that you hear so much about? What does he look like? What does he read? What, if anything, does he want to buy?

We were pondering these questions and wondering whether it would be possible to put together a composite picture of STEEL'S readers and have it resemble anything but a smudge. After all, there are some 50,000, according to authentic surveys, who read STEEL every week, and it certainly would help a lot to know just what they were all thinking, what they like to read, whether they read for profit, interest or amusement.

One way would be to spend 5 minutes with each of them and ask these questions. But 50,000 times 5 minutes is about a year and a half of work, plus traveling expenses that would buy five pairs of shoes for every one of the entire Ethiopian army.

Selection of material which will interest readers is the one weak link in

the publishing chain, it seems. You can go out and sell a man a subscription or sell him some advertising space, but you cannot be certain if, what, how often and how enthusiastically he reads what you print.

Our editors tell us that by continual trips into the field, they can get a typical cross section of STEEL'S readers, as well as information on the latest technical and news developments which *should* interest readers. But like the old horse who for ages has been led to the watering trough, you cannot make them drink what you have mixed.

A fairly accurate gage of a magazine's readability is the amount of correspondence received by the editors and the frequency with which the magazine is mentioned in conferences, meetings, roundtable discussions and other places where active minds gather. We could give you plenty of support to the statement that STEEL is high in readability.

One prominent executive recently told us: "I have so damn many magazines coming across my desk that I can't begin to assimilate them all. But every Monday morning, I read STEEL first thing. I like its conciseness, its arrangement and its lively editorial interpretation."

* * *

Calendar Quirk

ONE of our college professor friends was getting together his copies of STEEL for the first half of the year to have them bound for his departmental library, and he discovered he had only 25 copies. Knowing, as does every good prof., that there are 26 weeks in half a year, he requested us to please send the missing issue.

We hastened to assure him that he had all the issues of Volume 96, and that because of an unusual arrangement of weeks and dates in the calendar this year, there would be 27 issues in Volume 97 (the second half). He seemed satisfied after a fashion, but you can never tell. Maybe we should have mailed him another copy of the June 24 issue.

* * *

Vive l'Amerique

NOTE to Brasseries de la Meuse, 31 Rue de la Chapelle, Paris, France: Our department of foreign languages (including the Scandinavian) is grossly insulted by your letter of Oct. 17 to which an English translation is appended. Our versatile linguists have no difficulty in deciphering foreign communications; they have been thrown only once, and that time by what looked to be a letter from a reader in Hong Kong. But it was only an old laundry ticket.

* * *

Scoop Dept.

A STEEL company representative in Charlotte, N. C.—H. A. Roemer Jr., if you must know—sends in his subscription remittance and appends: "Two issues of STEEL have arrived and in both I have found information that would take me two weeks to get through the regular channels. For instance, the rapid scoop you made on welded pipe in Montana."

Our editor in charge of scoops thanks you, sir, and says that he will attempt to dig up some more for early publication. In other words, he scoops to conquer!

—SHRDLU

Reinforcing

Reinforcing Bar Prices, Page 83

New York—Reinforcing steel buying is heavier with the closing of several attractive contracts. For relief work projects, the procurement division, treasury department, New York, will purchase close to 2000 tons additional. Reinforcing bar prices are irregular. Mesh prices are comparatively steadier, but some shading prevails on light volume.

Pittsburgh — Successful bidders are being announced by the Pennsylvania state highway department early this week on the Nov. 8 letting, requirements for which include 533,525 pounds of bars for Blair and Huntingdon counties and mis-

cellaneous tonnages of mesh for 14 to 15 miles of pavement. Reinforcing bar mills in this district have begun to receive releases on the recent 84,000-ton order from the Los Angeles metropolitan water district, and are scheduling rollings accordingly. The prices quoted by distributors is 2.05c, base, Pittsburgh, for cut lengths in carload quantities. On certain tonnages, however, prices are irregular.

Cleveland — While the majority of reinforcing bar orders are reported as placed at the regular market prices, fabricators note increasing irregularity on some public works projects. Five hundred tons of rail steel for a government job in Ohio are understood to have been purchased through a Cleveland contractor at $9 a ton under the market. Tonnage is relatively scarce. Cleveland is about to award 360 tons for buildings at its easterly sewage plant.

Chicago — Bids have been taken on 600 tons for Chicago sanitary district work, bringing the total tonnage pending for this interest to 1700 tons. Among other large pending projects is the state hospital at Manteno, Ill., involving 1000 tons. Small lots are being placed from time to time for Illinois highway work, with additional inquiries expected during the next six weeks for similar construction. Orders for private building are light.

Boston—Reinforcing steel buying is heavier, contracts placed including close to 800 tons for sewers, bridges and highways in Connecticut. Inquiry is more active with more construction work being figured. Foundations for two housing projects in the Boston district will take several hundred tons.

San Francisco—The most important development in the reinforcing steel bar market was the award of general contracts for a portion of the metropolitan water district's reinforced concrete pipe line, specification 115, involving 14,050 tons, to be furnished by the contractors. American Concrete & Steel Pipe Co. obtained schedules 4-P and 5-P at $2,054,040, requiring 8550 tons of bars. United Concrete Pipe Corp. took schedule 8-P at $1,127,785, calling for 5500 tons. Bids on schedules 6-P and 7-P were rejected and new bids will be taken soon. These two schedules will require 8300 tons and will be supplied by the general contractors as the district has decided to use precast reinforced concrete pipe.

Philadelphia—Reinforcing bar demand is featured by an increasing amount of small orders and a better volume of new inquiry. The latest inquiry involves 11 schools here on which bids are scheduled to be opened Dec. 10. It is estimated that these schools will require about 4500 tons of reinforcing bars. Bids were opened on two schools Nov. 9 requiring 500 tons. Billet steel bar prices are less unsettled than recently.

Seattle—Prospects have improved with considerable construction work, federally financed, up for figures within 30 days. Numerous school buildings in Oregon, Washington and Idaho have been approved. It is estimated that at least 5000 tons of reinforcing bars will be required in jobs up for bids this month. Both this state and Oregon have plans

Concrete Awards Compared

	Tons
Week ended Nov. 9	17,916
Week ended Nov. 2	5,522
Week ended Oct. 26	6,924
This week, 1934	1,988
Weekly average, 1934	4,084
Weekly average, 1935	7,162
Weekly average, October	7,383
Total to date, 1934	202,027
Total to date, 1935	322,284

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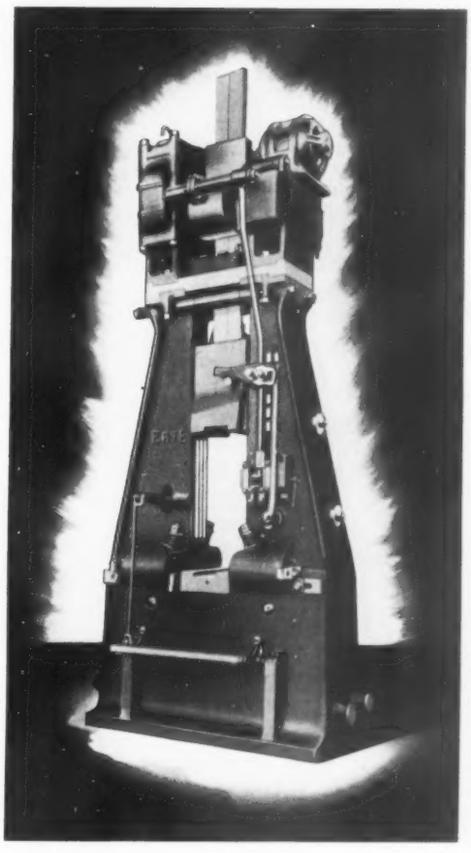

Not the interest on the national debt, nor the cost of potato crop control enforcement, but the value of the output of a single 2000-lb. ERIE Type M Motor Driven Hammer.

One of our customers (name on request) reports this figure as the twenty-four hour output of this one ERIE hammer. Deduct material, labor, and overhead, and you will agree that this machine is paying a handsome return on the investment. That's why we tell you ERIE hammers will earn their own way.

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ready and bids will soon be out for additions and new structures at state institutions.

Reinforcing Steel Awards

14,050 tons, schedule 4-p, 5-P and 8-P, specification 115, metropolitan water district, Los Angeles, for precast reinforced concrete pipe. General contract allocated as follows: To American Concrete & Steel Pipe Co., Los Angeles, schedule 4 and 5-P, 8550 tons, and to United Concrete Pipe Corp., Los Angeles, schedule 8-p, 5500 tons.

850 tons, highways, Burlington county, New Jersey, to Truscon Steel Co., Youngstown, O.; through S. J. Groves & Son Co., Ridgefield, N. J., and P. Camille Co., Westfield, N. J.

500 tons, Pleasant valley dam, Perrysville, O., Muskingum valley, Ohio, conservancy district, to Kalman Steel Corp., Bethlehem, Pa.; through Newhall Herkner Construction Co., Cleveland; previously reported as awarded to unstated fabricator.

450 tons, highway, eastern state parkway, sections 2 and 3, Putnam and Dutchess counties, New York, and highway, Garrison-Post road, Putnam county, New York, to Kalman Steel Corp., Bethlehem, Pa.; A. E. Ottaviano, Croton-on-Hudson, N. Y., general contractor; two contracts.

450 tons, second section, sewage treatment plant, metropolitan district commission, Hartford, Conn., to Concrete Steel Co., New York; F. H. McGraw & Co., New York, general contractor.

285 tons, science and academic building, Brooklyn college, Brooklyn, N. Y., to Carroll & McCready Co. Inc., Brooklyn; through T. J. Waters Co.

245 tons, state highway work in five counties in Montana, to unnamed interests.

210 tons, Blanco bridge, highway No. 2, Hays county, Texas, to Alamo Iron Works, San Antonio, Tex.; H. B. Zachary, Laredo, Tex., general contractor.

200 tons, state highway section, Middletown and bridge, route 156, Old Lyme, Conn., to Truscon Steel Co., Youngstown, O.; A. I. Savin Construction Co., East Hartford, Conn., general contractor.

120 tons, Andrew Jackson high school, Springfield, Queens, New York, to Carroll & McCready Co. Inc., New York; through George F. Driscoll Co.

120 tons, grade separation and approaches, Trumbull, Conn., to Truscon Steel Co., Youngstown, O.; Mariani Construction Co., general contractor.

113 tons, two municipal bridges, Colorado Springs, Colo., to unnamed interest.

112 tons, state highway bridge, Seminole county, Oklahoma, to Southern States Steel Corp., Dallas, Tex.; Keliher Construction Co., Dallas, general contractor.

111 tons, state bridges in Johnson and Lincoln counties, Wyoming, to unnamed interests.

100 tons, buildings, Schluderberg-Kurdle Co., Baltimore, to National Building Supply Co., Baltimore; M. A. Long Co., Baltimore, general contractors.

Reinforcing Steel Pending

8300 tons, schedule 6-P and 7-P, metropolitan water district, Los Angeles, bids rejected and new bids will be called for soon for precast reinforced concrete pipe only.

5000 tons, 13 public schools, Philadelphia; bids opened on two Nov. 9, and on the remaining 11 will be opened Dec. 10.

1350 tons, Seminole dam and Casper-Alcove project, Wyoming; bids at Casper, Wyo., Nov. 25 and 26.

1000 tons, state hospital, Manteno, Ill.

815 tons, Bull Lake dam, Riverton project, Wyoming; bids soon.

350 tons, sewer, Boston; bids in.

300 tons, miscellaneous state road work; bids at Harrisburg, Pa., Nov. 15.

240 tons, storehouse at Presidio, San Francisco, Calif.; bids opened.

225 tons, highway and small bridges, Cranbury, Middlesex county, New Jersey; bids Nov. 25.

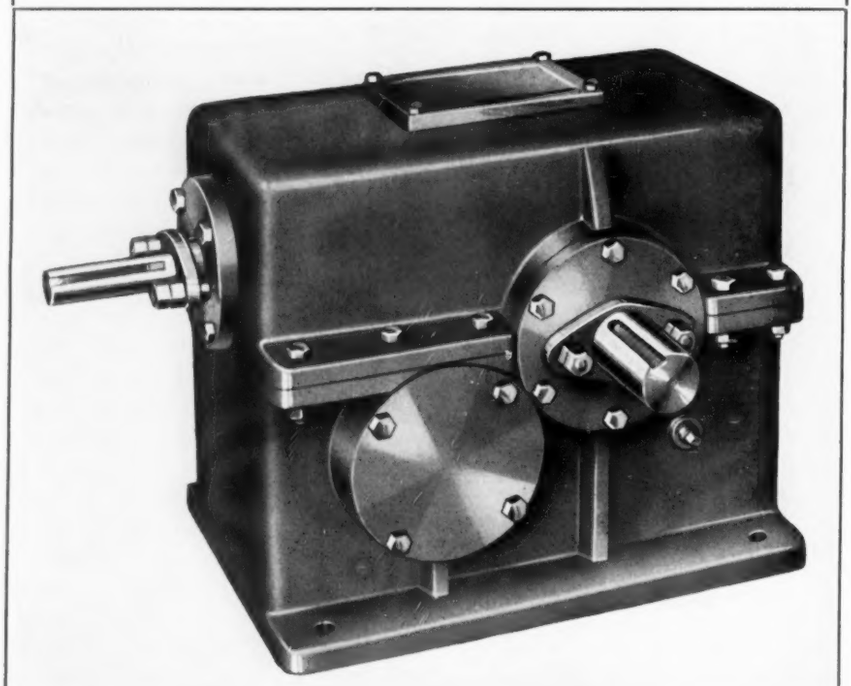
200 tons, Pennsylvania state road work; bids opened in Harrisburg, Nov. 8.

175 tons, highway, route 34, section 4, Monmouth county, New Jersey; bids Nov. 18.

114 tons, state underpass, Humboldt county, California; bids opened.

100 tons, state crossing near Beaumont, Riverside county, California; bids Nov. 21.

GRANT SPEED REDUCERS



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Your inquiries will receive prompt, expert attention.

Grant Gear Works, B. St., South Boston, Mass.

Pig Iron

Pig Iron Prices, Page 84

Cleveland—The market is quiet, following heavy coverage prior to the price advance of $1 a ton Nov. 1. A few carload sales, however, have been made at the new prices. November shipments are increasing over the October average. Producers expect the movement will reach a peak in December, when melters specify all the material remaining to them on contracts.

Producers of silvery and bessemer ferrosilicon irons have adopted a new system of quoting prices, effective immediately. Heretofore the price of 6 to 7 per cent silvery was $22.75, Jackson county, Ohio, base. Now it is $22.75 for 6 to 6.50 per cent, and $23.25 for 6.51 to 7 per cent.

If a buyer stays in the lower half of the bracket the price to him is unchanged, but if he orders iron in the upper half the price is up 50 cents a ton.

For 7 to 8 per cent the price was $23.75, the differential above 6 to 7 per cent having been $1 a ton. Now for 7 to 7.50 per cent the price remains $23.75, but for 7.51 to 8 per cent it is $24.25. The changes occur in half points and half dollars, rather than single points and $1, up to 12 per cent.

Similarly, the system of quoting bessemer ferrosilicon has been revised, the actual price of bessemer ferrosilicon being $1 a ton above silvery iron for the same percentage.

Pittsburgh — Pig iron buyers will be permitted to specify shipments over the balance of the year against the orders placed prior to the price advance of $1 a ton, announced Nov. 1. Consequently iron shipments in

this district over the next six weeks will be heavy. On all business not under contract, the market is now quoted $19.50 for foundry grades, $20 on bessemer and $19 on basic, Pittsburgh district furnace base. A leading steel interest, which recently began soliciting merchant iron tonnage, now has three of its blast furnaces on, the output of which is devoted solely to this type of trade. The Neville Island furnace of Davison Coke & Iron Co., banked for the past ten days, probably will resume within the next week.

Chicago — Pig iron consumers are taking shipments against contract entered during September and October, and so far in November deliveries are about one-third heavier than a month ago. The principal problem facing sellers is to complete shipments against the heavy tonnage on books, but foundries show a willingness to spread the movement over the remainder of the year rather than receive speculative tonnage late in December. Automotive foundries continue to lead in recent production gains, though the average for the industry shows improvement compared with the rate of 30 or 60 days ago. New pig iron business at the $19.50, furnace, price consists of only small lots.

Boston — Pig iron buying is dull following the recent flurry in purchasing before the $1 advance. Even small-lot buyers in this district did advance covering to the extent of their ability before the increase. Iron contracted for this quarter must be shipped before the end of the year, or the contracts canceled. Sellers of Indian iron followed the domestic price advance. Other foreign brands are higher, but still move under domestic prices. Foundry melt tends upward slowly, those serving the machine tool trade being the most active.

New York—Due to protective covering in October, prior to the price advance, new pig iron buying continues quiet. However, shipments are expanding, with foundries in the metropolitan district now operating at an average of around 45 per cent, an increase of 5 per cent since Nov. 1.

Philadelphia — While shipments of pig iron continue to expand, new orders have fallen off due to anticipatory buying in October prior to the $1 advance on most grades Nov. 1. A Delaware river pipemaker is understood to have taken most, if not all, of the 1500 tons of Russian iron which arrived at this port recently, the second substantial arrival of this iron within a period of three weeks.

Youngstown, O.—While the advance of $1 a ton on pig iron announced by valley furnaces a week ago may have hurried some extra buying here demand for No. 2 foundry, basic and malleable has attained good proportions. Foundries appear to be more interested now in pig iron purchases than in several years. Republic Steel Corp. relighted its third Haselton group stack several days ago.

Cincinnati — A definite lull in buying of pig iron followed price increases of $1 a ton, melters generally having covered requirements, previous to the advance, for full fourth quarter needs and additional tonnage for inventory. Quotations on southern iron, No. 2 foundry, Hamilton basing point, were advanced to $20.007 thus maintaining the customary 38-cent differential under northern iron. Shipments maintain the quickened pace set in late October, with outlook for much heavier movement next month.

St. Louis — Insofar as new purchasing is concerned the market for pig iron is virtually at a standstill. Some lesser melters postponed covering in the recent buying movement, before the advance of $1 per ton, and are now obliged to come into the market. The melt is holding up well, increasing in some quarters. For the first time in a number of years, farm implement interests are manufacturing stock in anticipation of spring demands.

Birmingham, Ala. — Active purchasing has stabilized books with blast furnace interests, and production and shipments will be steady for an indefinite period. Melters have contracted ahead to some extent, the $14.50, No. 2 foundry, base price being maintained. Prospects are now certain that production for year will exceed last year's total of 1,171,650 tons. Two additional blast furnaces were blown in this week, Tennessee Coal, Iron & Railroad Co. stacks, making nine in operation in this district.

Toronto, Ont. — A few larger consumers have taken iron in lots of 200 and 300 tons to meet needs for a few weeks ahead. Some plants, idle for several months, are preparing to resume operations and this will stimulate demand.

Scrap

Scrap Prices, Page 85

Pittsburgh—The 20,000-ton heavy melting steel purchases of a leading interest here on Nov. 7 at $13.75, delivered to three of its Pittsburgh district plants, enlivened the scrap market and arrested a downward trend which had been in evidence previously. Consequently No. 1

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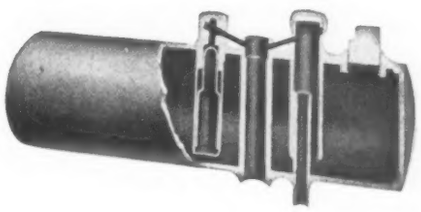

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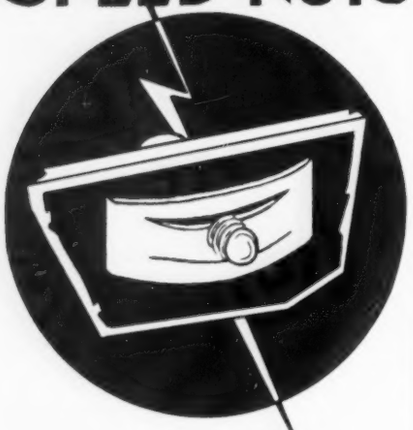

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heavy melting steel moved upward 50 cents a ton to a range of $13.50 to $14. Other scrap grades are quiet. The aforementioned 20,000-ton purchase marks the first open participation in the scrap market of this Pittsburgh buyer in 1935.

Cleveland—While shipments of iron and steel scrap maintain a fairly steady level new business is limited. In general, prices are steady except with borings, turnings and No. 2 busheling, all of which have been marked down 50 cents a ton. At Youngstown, the market continues quiet as to new purchases, especially by the larger consumers.

Chicago—Heavy melting steel has advanced 25 cents as a result of active demand from sellers. Brokers find it difficult to pick up this grade at less than $13 in contrast to previous mill purchases at $12.75. Shipments against contracts continue heavy and despite fairly large offerings, the market is strong. Malleable scrap is up 50 cents as a result of good demand and light supplies.

Boston—Scrap prices, with the exception of turnings, which are inclined to be slightly easier, are steadier, notably for export, shippers paying $9.50 dock for No. 1 heavy melting steel and $8.50 for No. 2. Buying for boat loading, while not heavy, is steady and still remains the most active feature. Domestic consumers are buying spot lots from time to time, but refuse to follow export quotations, usually picking up shipments about 50 cents a ton under. Bids for shipment to the Pittsburgh and other outside districts are still too low to attract much tonnage.

New York—Rails for rolling and turnings are easier, but most grades of scrap are steady with sentiment somewhat improved. Buying is light, both for export and domestic consumption. Cast grades appear to be the strongest of the active grades.

Philadelphia—Purchase of 1000 tons by an eastern consumer at $12, delivered, has advanced the market on heavy breakable cast, and the purchase of a round tonnage at $6.50, delivered, Birdsboro, Pa., has boosted the market on blast furnace borings and turnings. These two grades now hold, respectively, at $11.50 to $12 and $6 to $6.50. All other grades are unchanged and in general consuming demand is still quiet. The Pencoyd, Pa., consumer purchased 2000 tons of new compressed sheets from the Edward G. Budd Mfg. Co., Philadelphia, at slightly over $11, Budd plant, it is understood.

Cincinnati—Mills in this district are dabbling in scrap iron and steel, taking miscellaneous lots but continuing their apathy toward tonnage commitments. Quotations are unchanged on these transactions.

Detroit—No. 2 heavy melting steel and scrap rails have declined 50 cents per ton and borings and short shoveling turnings 25 cents. No. 1 heavy melting steel is weak but unchanged, an important consumer having interrupted shipments temporarily.

St. Louis—The market for iron and steel scrap was enlivened by the purchase by an east side mill of 5000 tons of steel, the largest single transfer recorded in some weeks.

The price paid was approximately the same as the last previous sale to this interest. Delivery specified is for 60 days and the business went to several dealers.

Birmingham, Ala.—Sentiment in the steel and iron scrap market is better and prices are firm. Buying is light and supplies large.

Seattle—While export demand is slow, the market remains firm, due largely to continued buying by mills. Rolling plants are taking scrap in proportion to consumption and are paying $9.50 gross for No. 1 melting and $7.50 for No. 2. Local buying has been active for a fortnight, domestic prices determining the market.

Toronto, Ont.—Shipments of iron and steel scrap are increasing. Mills in the Hamilton district are the largest buyers. Steel Co. of Canada is taking heavy melting steel on old contract. Turnings also are in better demand both in the Toronto and Montreal markets, while other steel lines are beginning to show improvement. Foundries are in the market from time to time for iron grades.

Warehouse

Warehouse Prices, Page 86

Pittsburgh—Bookings by local jobbers continue fairly heavy at a generally undiminished rate. No change in prices has occurred, the following being quoted for in-town Pittsburgh delivery: Bars and small shapes, 2.95c and 3.10c; plates and structurals, 3.15c; bands, 3.20c, and hoops, 3.70c.

Cleveland—Mills are slowing up in deliveries of cold-finished sheets, some being booked up to the third week in December, and this is resulting in a slightly heavier demand on warehouses. Alloy steels also are active. In the heavy finished lines, miscellaneous orders for plates are larger in the aggregate than these for shapes. Tonnage so far this month has continued at about the same rate as in October, which month was substantially better than September.

Chicago—Warehouse sales have shown little change so far in November, and while some seasonal de-

crease is anticipated later in the month, the recession is expected to be somewhat smaller than usual. Prices are unchanged.

Boston — Sales are in good volume, with demand well spread. Scully Steel Products Co., Boston, and S. Weinstein Supply Co., New York, booked the bulk of the inquiry for Eastport, Me., including mild steel flats and rounds, also cold-rolled. There were 16 bidders, mostly jobbers, Oct. 23, and prices quoted for delivery varied considerably.

New York—While sales thus far are somewhat under the October rate, buying is brisk and well distributed. Last month was the best in several years with some jobbers. There is some price shading, although this is not prevalent among the more representative distributors. Cold-finished, alloy steels and specialty lines are moving well, while structurals are inclined to lag.

Philadelphia — Jobbing demand continues to expand, being at a better rate than in October, which for a number of resellers was one of the very best months this year. The increasingly extended mill deliveries is resulting in improved demand for sheets.

Cincinnati — Sales so far this month maintained the October level and were featureless. Prices are unchanged.

St. Louis—Demand is holding at about the October average. Nuts and bolts have held the recent slight betterment, wire nails are moving in considerably larger volume than a year ago, and structural shapes and reinforcing concrete are active. Prices remain unchanged.

Seattle — Jobbing houses report a fairly steady volume of business, no item outstanding, but the aggregate of sales holding up well. There is little mill buying, turnover being in small lots. The price structure is being generally maintained.

Iron Ore

Iron Ore Prices, Page 85

New York—The largest arrivals of foreign ores to have been reported along the eastern seaboard in many months came into Baltimore in September, according to figures recently compiled. The total approaches 150,000 tons, and includes 84,000 tons of Chilian ore; 21,000 tons of Australian ore; 6500 tons of Russian iron ore, and a similar tonnage of Swedish iron ore. In addition 4035 tons of Brazilian manganese ore came in. All of this ore was for delivery at Sparrows Point, it is said.

In addition 8300 tons of Indian manganese ore and 8500 tons of Russian manganese ore were received; also 8500 tons of pyrites and 3048 tons of chrome ore. More than 1500 tons of ferromanganese, including 500 tons from the Netherlands, also came in, as well as 600 tons of Russian pig iron and 101 tons of Swedish pig iron.

Cleveland — Lake Superior iron ore shipping schedules this month, closing the season, call for about 1,500,000 tons. The Lake Superior Iron Ore association's official report shows 26,804,874 tons to Nov. 1 this year, an increase of 23 per cent over the comparable period last year. In October producers forwarded 4,600,661 tons to lower lake ports, notable for the fact this was 74 per cent larger than in October, 1934.

Preliminary estimates made by the association indicate consumption of Lake Superior iron ore in October was approximately 2,965,000, which is the largest amount for any month since October 1930. In May, 1934 consumption totaled 2,958,000 tons.

Tin Plate

Tin Plate Prices, Page 82

Pittsburgh—The 1936 contract price on tin plate may be announced within a week or weeks if precedent is followed. Though many interests would rather see a continuation of the present $5.25 per base box, the $2 a ton advance in sheet and tin bars announced last week is believed to forecast an advance in tin plate. With fairly heavy orders from can-makers for tin plate to be used in beer cans, the rate of operations continues to average 60 per cent.

Youngstown, O.—Continued surprise in the steady inflow of new tin plate orders is expressed by makers here. Mills down for repairs in the normaly dull tin plate season are being hurried into condition to relieve the pressure for quick deliveries.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 83

Heavy buying which occurred in anticipation of the recent price increase continues to hold back current sales of bolts and nuts. Better prospects for carbuilding and some increase in specifications by railroads give encouragement. Miscellaneous users in the Chicago district continue to specify well, particularly tractor manufacturers.

At Cleveland, half the current output of nuts and bolts is going to auto-

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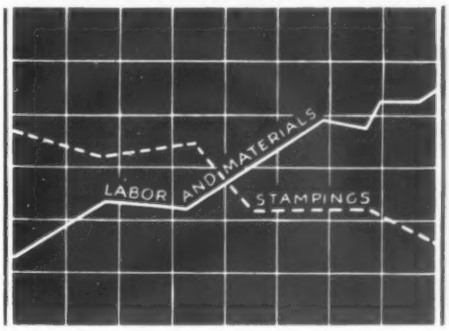

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mobile and parts manufacturers. Railroads are practically out of the market there, while demand from jobbers is fairly strong.

Wrought washer manufacturers continue to quote $6.25 off list for less carload lots and $6.50 off for carloads. The bolt and nut market is quiet at Pittsburgh. Quotations generally are unchanged at around 75 off list on carriage and machine bolts and 2.90c, Pittsburgh and Cleveland, 3.00c, Chicago, for large rivets. Small rivets hold at 70-5 off.

Reports are current at New York that bolt and nut prices may be advanced not later than Dec. 1.

Semifinished

Semifinished Prices, Page 83

Pittsburgh—On Nov. 5 a leading Pittsburgh producer began quoting $29, gross ton, base, Pittsburgh, for rerolling billets, blooms and slabs, an advance of $2 a ton over the former base of $27, Pittsburgh. At the same time, the market on sheet bars also was advanced $2 a ton to $30, base, Pittsburgh. The really effective date of this advance will be Jan. 1, as practically all consumers will be covered for the balance of this quarter. On Nov. 6 a Youngstown, O., producer took the lead in announcing a $2 a ton advance on skelp, placing the market at 1.80c, all basing points. This advance also will be Jan. 1 for all contract business not protected.

Chicago—Producers of rerolling billets, slabs, sheet bars and skelp have advanced prices $2 a ton. Wire rods so far have not been affected. Rerolling billets also have been raised $2 at Duluth. Increased demand has accompanied the higher prices and heavier production is in prospect to ship material bought speculatively.

Steel in Europe

Foreign Steel Prices, Page 86

London—(*By Cable*)—British pig iron markets are expanding and some contracts are being made for delivery into third quarter of 1936. Midland pig iron prices have been advanced an average of 5s per ton ($1.25). Demand for steel is increasingly active and the Continental import quota has been increased by 10,000 tons per month for six months to meet British needs. A large railroad development program is relied on to stimulate production further. Steel exports are in larger volume, galvanized sheets showing some gain, but tin plate is quieter, owing to restrictions on exports.

The Continent reports export trade improving, especially to China, Egypt, India and Scandinavia. Germany is increasing its shipments to South America.

Metallurgical Coke

Coke Prices, Page 83

Demand and shipments are appreciably better than in the past and prices are firm in all markets. Foundry coke shipments at Chicago are 20 to 25 per cent heavier than in October. Cincinnati dealers find metallurgical grades moving in increasing volume and domestic demand larger as winter nears. Shipments in the St. Louis area are at least equal to the October rate, with some consumers accumulating stocks. Birmingham producers are able to meet demands of consumers in spite of the coal strike.

The market is more active, at Pittsburgh finding by-product coke producers operating at a faster pace with backlogs for domestic consumption. In the beehive grades, prices are firm and fluctuate at around $3.55 to $3.75, Connellsville, Pa., ovens, for standard furnace coke, from $4.35 to $4.50 for common foundry coke, and $5.50 to $5.75 on premium foundry.

Coke By-Products

Coke By-Product Prices, Page 83

New York—Naphthalene prices have been advanced and contracting is being done at the new quotations. Flakes and balls are now 6.75c per pound, wholesale in barrel lots; 7.00c in 50-pound cartons, and 8.00c, retail. Western prices are one-half cent higher. Benzol has also been advanced to 18.00c per gallon, tank-lots, producers' plants. Demand for distillate is brisk, notably toluol for the lacquer trade.

Ferroalloys

Ferroalloy Prices, Page 84

New York—Ferromanganese prices are steady at $85, duty paid, Atlantic and Gulf ports, with specifications showing little fluctuation. Domestic spiegeleisen, 19 to 21 per cent, is firm at $26, Palmerton, Pa., on lots up to 50 tons, and $24 on 50 tons and over.

Quicksilver

New York—Quicksilver prices are firm in a quiet market. Only occasional small inquiries have been noted, with domestic supplies still highly restricted. Prices generally are $75 to $76 a virgin flask.

Nonferrous Metals

Nonferrous Metal Prices, Page 84

New York—Sentiment in the nonferrous metals improved last week on the active pace of shipments to consumers.

Copper—Daily sales were light but the undertone held firm at 9.25c, Connecticut, for electrolytic. It is estimated that October shipments will be reported at about 60,000 tons

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while production is being maintained below consumption.

Lead—Demand for lead was active throughout the week with leading sellers equaling daily ore intakes. A strong undertone prevailed at 4.35c, East St. Louis and 4.50c, New York.

Zinc—Prices advanced Friday to a range of 4.85c to 4.95c, East St. Louis, for prime western on the steadily improving statistical position of the industry. Total slab zinc stocks were cut 10,362 tons during last month to the lowest level since October, 1933. Shipments were the heaviest for any month since 1929.

Tin—Prices were held fairly steady in the domestic market due to scarcity of spot supplies. Prices in London fluctuated widely. At the close of the week spot Straits was quoted 52.50c to 52.75c. Consumer demand was light.

Antimony—The market was featureless with quotations holding on the basis of 15.00c, duty paid New York, for Chinese spot and 14.75c New York, for American spot.

Lists Trade Associations

Market Research Series No. 4, a bulletin prepared by C. Judkins, chief of the trade association section, marketing research and service division, bureau of foreign and domestic commerce, Washington, lists over 800 industries which were under NRA codes and gives complete information concerning the principal trade associations, the approximate size of the industry, the address of code authorities and other details. Copies may be obtained at 10 cents each from the bureau or any of its district offices located in the principal cities.

PREMIUM, BONUS SYSTEMS GAINING IN POPULARITY

Premium and bonus systems of wage payments in effect in 1935 cover approximately three times as many wage earners as in 1924, according to data collected by the National Industrial Conference board, New York, in a survey of financial incentives in modern industry. The proportion of wage earners on piece rates has dropped two-fifths in the same interval while the proportion on time rates is virtually unchanged. The board's report covers 631 companies employing more than 700,000 wage earners.

Premium or bonus plans are relatively more popular in the medium-size plants, than in either the very small or very large establishments. In plants employing between 250 and 999 wage earners, 23.2 per cent were being paid under premium or bonus plans. In plants employing 1000 to 4999 the proportion was 24.4 per cent.

AMERICAN IRON ORE OUTPUT DOWN 44 PER CENT IN 1934

Iron ore mined in the United States in 1934 amounted to 24,587,616 gross tons, an increase of 40 per cent compared with 1933 but 35 per cent below the average for the preceding five years, according to final figures by the bureau of mines, Washington. Iron ore was produced at 141 mines in 15 states, compared with 132 mines in 15 states in 1933.

Shipments in 1934 amounted to 25,792,606 gross tons valued at $66,483,846, an increase of 4.7 per cent in quantity and of 4.2 per cent in total value compared with 1933. Compared with the 5-year average for 1929 to 1933, the 1934 shipments showed a decrease of 32 per cent. The average value per ton of iron ore at the mines in 1934 was $2.58 against $2.59 in 1933.

Stocks at mines at the close of 1934 amounted to 10,340,690 gross tons, a decrease of 6 per cent from 1933. Stocks at the end of 1934 were about 1,474,000 tons below the average for the preceding five years.

KEYSTONE SELLS NOTES TO RETIRE PREFERRED STOCK

Keystone Steel & Wire Co., Peoria, Ill., plans to sell a block of serial notes to be used for the retirement of outstanding 7 per cent preferred stock. The latter amounts to 19,799 shares of $100 par preferred. This would require notes of approximately $2,080,000. For the year ended June 30, 1935, the company reported net profit of $1,167,790.

BALDWIN REDUCES ITS LOSS

Baldwin Locomotive Works and subsidiaries, including the Midvale Co., report net loss of $2,279,898 in the year ended Sept. 30, compared with a deficit of $3,777,093 in the preceding year. The current year's sales totaled $20,599,008; a year ago, $12,302,597.

IRONMASTER RETURNS TO AIR

American Rolling Mill Co., Middletown, O., is now in its seventh consecutive season on the air in a good-will promotion of a better public understanding of the part iron and steel plays in everyday life. Bennett Chapple, vice president, continues as "The Ironmaster."

Canada's Metalworking Industries Gain in 1934

Production of Canada's iron, steel and metalworking industries in 1934 had a total value of $307,566,644, an increase of approximately 45 per cent over the previous year's output of $211,961,908.

With the exception of the bridge and structural steel industry, which declined 16 per cent to $4,697,043, all industries participating showed increases, as follows: Primary iron and steel, 57 per cent to $29,101,463; castings and forgings, 40 per cent to $34,000,498; boilers, tanks and engines, 46 per cent to $6,496,567; agricultural implements, 62 per cent to $8,655,078; machinery, 33

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per cent $25,234,863; automobiles, 78 per cent to $76,133,448; automobile parts, 89 per cent to $24,623,-452; bicycles, 45 per cent to $1,033,-422; railway rolling stock, 16 per cent to $34,362,912; wire and wire goods, 35 per cent $14,206,230; sheet metal products, 24 per cent to $32,225,100; hardware and tools, 44 per cent to $14,069,453; miscellaneous iron and steel products, 11 per cent to $2,727,115.

Plants in operation in 1934 totaled 1309, compared with 1291 in 1933, and the average number of employes increased from 70,947 to 82,-183. Salaries and wages amounted to $89,555,753, as against $69,482,-730, and cost of materials advanced from $97,705,853 to $153,470,503.

Imports for the year increased 54 per cent over 1933, having a total value of $93,615,090, compared with $60,734,395. Imports from the United States totaled $71,056,276, an increase of $29,200,000. The year's exports advanced from $22,182,952 to $37,402,314, those to the United States declining from $4,070,426 to $2,782,307.

Activities of Steel Users and Makers

AMERICAN FOUNDRY EQUIPMENT CO., Mishawaka, Ind., is shipping several wheelabrators to Russia on order of the Amtorg Trading Corp., New York. One is a cabinet type for cleaning automobile cylinder blocks inside and out, by mechanical abrasive action without compressed air. The shipment includes three 42 x 48-inch wheelabrator tumblasts for cleaning castings and forgings, equipped with loaders and tubular dust collectors. This is said to be the largest airless abrasive installation ever put into use outside the United States.

♦ ♦ ♦

Tuscar Metals Inc. has been formed to utilize the plant of the American Sheet & Tin Plate Co., Dover, O., which has been idle four years.

♦ ♦ ♦

Link-Belt Co., Chicago, plans to move its executive offices from 910 South Michigan avenue, to the Bell building, 307 North Michigan avenue. The transfer will take place about Nov. 30.

♦ ♦ ♦

Diamond Chain & Mfg. Co., Indianapolis, has appointed the Mayhew Machine & Engineering Co., Dallas, Tex., an authorized distributor of its stock of roller chains, sprockets and flexible couplings.

♦ ♦ ♦

William M. Bailey Co., Pittsburgh, recently completed installation of checker brick work for the third stove at the Steubenville, O., plant of Wheeling Steel Corp., and has received an order for the fourth stove at the same works.

♦ ♦ ♦

Lebanon Steel Foundry, Lebanon, Pa., has appointed Peter A. Frasse & Co. Inc., with offices in New York, Philadelphia, Buffalo, Hartford, Conn., and Rochester and Syracuse, N. Y., sales representative for its corrosion, stainless, and heat-resistant alloy cast products in New York, Connecticut, New Jersey, Delaware, Maryland, Virginia, and Pennsylvania, east of Altoona.

♦ ♦ ♦

American MonoRail Co., Cleveland, is removing its Philadelphia branch office from 3312 Lancaster street, to Arch and Thirty-third streets, to meet demand for increased office facilities.

♦ ♦ ♦

Air Conditioning Manufacturers association, 915 Southern building, Washington, reports the Vilter Mfg. Co., Milwaukee, and the Baker Ice Machine Co. Inc., of Omaha, Nebr., have joined it.

♦ ♦ ♦

Erie Foundry Co., Erie, Pa., manufacturer of steam hammers, board drop hammers, and trimming presses, has appointed the Syracuse Supply Co., with offices in Buffalo, Syracuse and Rochester, N. Y., to represent it in these districts.

♦ ♦ ♦

To promote new industries and assist present ones, city officials of Bayonne, N. J., have reduced the assessed valuations of industries located in their city. Among others, the Babcock & Wilcox Co. valuation has been reduced $1,095,000.

♦ ♦ ♦

Monessen Southwestern Railway Co., subsidiary of Pittsburgh Steel Co., Pittsburgh, has petitioned to become an interstate carrier. The railroad connects mills with both the Pittsburgh & West Virginia and the Pittsburgh & Lake Erie roads. The latter is opposing the plan.

♦ ♦ ♦

Automatic Temperature Control Co., Philadelphia, has appointed Carman Adams Inc. its representative with headquarters at 2970 West Grand boulevard, Detroit, and also Fred I. Tourtelot Co. as representative, with headquarters at 20 East Jackson boulevard, Chicago.

♦ ♦ ♦

Foote Bros. Gear & Machine Co., Chicago, was recently awarded, through the Independent Bridge Co., Pittsburgh, the contract for all of the mitre gate and tainter valve operating machinery for three large locks and dams in the Mississippi river. One of these is to be located at Red Wing, Minn., the second at Le Claire, Iowa, and the third at New Boston, Iowa. In the last three years Foote Bros. have furnished all of the dam and lock operating equipment for the Illinois waterway, opening traffic between the Mississippi river and Lake Michigan.

♦ ♦ ♦

Thwing Instrument Co., Philadelphia, Dr. Charles B. Thwing president, manufacturer of pyrometer and paper testing instruments, has changed its name to Thwing-Albert Instrument Co. The change is in name only and does not affect ownership, management, policy or product. E. J. Albert,

These Springs Look Alike

This spring has a long, and useful life of one hundred million or more compressions.

This spring may fail before reaching one hundred thousand compressions.

THE DIFFERENCE?

Here

Carefully selected materials; Proper design and manufacturing methods; controlled heat-treating; and the Fifty Years Experience of

RAYMOND MFG. CO.
Corry, Pa.
Producers of Superior Springs

Here

Ordinary spring wire, Out-of-date methods, poorly regulated heat treatment, lack of broad experience, produce the ordinary spring, perhaps useful fifty years ago, but worse than useless in the high grade engineered products of today.

whose name has been included in the firm style, has been associated with the company for 17 years as manager and secretary. The company was founded in 1906 by Dr. Thwing and has developed many pyrometer applications and taken out many patents for temperature measuring and controlling instruments.

♦ ♦ ♦

Dr. B. D. Saklatwalla announces the opening of offices in the Gulf building, Pittsburgh, for an industrial development organization which, in addition to serving the metallurgical and chemical industries in a consulting and advisory capacity, will undertake development and exploitation of new steels, alloys and other technical products for specific requirements. This organization will particularly specialize in handling transfer of new engineering developments, processes and products among the various industrial countries of the world, with suitable foreign connections.

United States Rustless Steel & Iron Corp., of which Dr. Saklatwalla is also president moved its offices to the Gulf building, Pittsburgh, where it will continue its business as a separate organization.

Men of Industry

(*Continued from Page* 28)

years with the Newton Steel Co., has joined the Detroit organization of Youngstown Sheet & Tube.

♦ ♦ ♦

C. F. Burgess has been elected to the newly-created office of chairman of board of the C. F. Burgess Laboratories Inc., Madison, Wis.

Arba B. Marvin, New York, a participant in the organization of the Laboratories, and its attorney for more than 20 years, has been elected president.

♦ ♦ ♦

Maj. W. D. Styer, in charge of the federal engineers' office at Pittsburgh, has been transferred as district engineer at the Panama Canal Zone.

Col. Richard Park, now commanding the 11th engineers in the Panama Canal Zone, has been appointed district engineer at Pittsburgh.

♦ ♦ ♦

E. T. Weir, chairman of the National Steel Corp. Pittsburgh; Charles R. Hook, president, American Rolling Mill Co., Middletown, O., and James W. Hook, president of the Geometric Tool Co., New Haven, Conn., are scheduled to speak at the annual congress of American industry to be held in New York, Dec. 4-5.

♦ ♦ ♦

Clarence Stanley, executive vice president of the Union Trust Co., Pittsburgh, has been appointed a director of Pittsburgh Steel Co., Pittsburgh, to succeed the late H. C. McEldowney.

♦ ♦ ♦

William A. Irvin, president of the United States Steel Corp., New York, is on a two-week tour of the Corporation's western properties.

♦ ♦ ♦

O. C. Huffman, president, Continental Can Co., has been elected a director of Vulcan Detinning Co., Sewaren, N. J.

♦ ♦ ♦

Earl Stone, formerly with the Colorado Fuel & Iron Co., Denver, has been appointed supervisor of WPA projects in Pueblo and eight other southern Colorado counties.

♦ ♦ ♦

C. E. Wilson, vice president in charge of the merchandise department of the General Electric Co., Bridgeport, Conn., has been assigned responsibility for direction of all appliance activities of the company. He has been associated with the company for 21 years.

♦ ♦ ♦

Henry S. Morgan, a director and executive officer of Morgan, Stanley & Co. Inc., and Robert C. Stanley, president, International Nickel Co., have been elected members of the board of directors of General Electric Co., Schenectady, N. Y., to fill vacancies.

♦ ♦ ♦

Ross L. Leffler, formerly welfare and employment superintendent at the Duquesne works of the Carnegie Steel Co., has been appointed manager of industrial relations in the Pittsburgh district for Carnegie-Illinois Steel Corp., a newly-created post. He will also have charge of safety and employment.

♦ ♦ ♦

D. H. Bacon, advertising manager of the Surface Combustion Corp., Toledo, O., has been appointed account executive with Ketchum, MacLeod & Grove, Pittsburgh, advertising agency.

♦ ♦ ♦

Eugene D. Milener has been named secretary of the industrial gas section of the American Gas association, New York, succeeding C. W. Berghorn, who has resigned. Mr. Milener, a native of Virginia, and a graduate of Baltimore Polytechnic Institute and the University of Maryland, has been a member of the Association's headquarters staff for seven years.

♦ ♦ ♦

Homer H. Ewing, manager of the London office of E. I. du Pont de Nemours & Co., Wilmington, Del., will be transferred to Wilmington as assistant director of the development division of the chemical department, effective Jan. 1.

Caesar A. Grasselli, in the Wilmington office, will be transferred to the London office as assistant manager, effective Dec. 1.

Charles B. McCoy will be transferred from the purchasing department at Wilmington to the London office.

♦ ♦ ♦

J. Seton Gray has been elected president of the Unit Holding Corp., Milwaukee, a reorganization of the Unit Corp. of America. He also is president of the three operating subsidiaries, namely, Fuller Mfg. Co., Kalamazoo, Mich.; Unit Drop Forge

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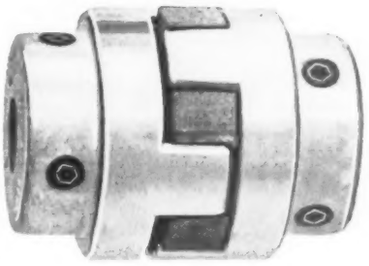

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♦ ♦ ♦

Allan C. Stoneman has been elected president of the Flexlume Sign Corp., Buffalo. Mr. Stoneman formerly was works manager for Foote Bros. Gear & Machine Co., Chicago.

Hook Sees Housing Recovery Stimulus

(*Concluded from Page* 19)

approximately 90 per cent of the homes of the country do not enjoy this convenience. There is no reason to believe that lower prices and an improved product should not appreciably increase the potential volume in the housing industry as well.

The industrial production of homes would undoubtedly require a new conception of home financing in order to stimulate activity in this important field. Space does not permit a discussion of the recommendations of the committee pertaining to financing but I will be glad to make the information available to anyone who is interested.

I am tremendously encouraged by the growing acceptance of the dominating factor that home building will be in the return to normal employment.

This new conception of housing America is the task of private enterprise. The government can encourage, but it should limit its own activities to providing housing for that small group which is either totally or partially dependent upon society. They who usually find shelter in abject, depressive slums need shelter of a better type which will improve their mental and moral status. Let this be the government's field, for, in any event, this group is always the ward of government.

Certainly no one can deny that this nation is not plentifully endowed with potential opportunities for progress. Opportunity is not dead! America is not over-built! America is not over-produced! It is under-bought! But unemployment will continue as long as we attempt to apply the principle of social control of natural economic functions.

Industry and commerce possess the initiative and the intelligence to meet the challenge of the times. When the government is brought to a realization of its proper limitations and functions, and is willing to work with private enterprise, then, and not until then, will the employables be transferred from the relief rolls to the payrolls of commerce and industry.

Rising Freight Traffic Spur To Car, Locomotive Program

(*Concluded from Page* 16)

reduced expenditures for maintenance and operations.

In 1930 the railroads owned 2,300,000 freight cars, of which 6.2 per cent were in bad order. At present, the railroads own 1,900,000 freight cars, of which 15.3 per cent are in bad order. The result is that the present number of serviceable freight cars is about 1,500,000, or 600,000 less than available in 1930.

A recent study on the capacity of existing cars leads to the conclusion that loading equivalent to the 1930 rate can be accomplished "at the hazard of having car shortages at some places or for some particular type of cars." Many cars reported as serviceable are in the state of repair compelling them to be carded "for rough freight only."

It is understood that efforts have been under way recently to interest private capital in New York to set up a central financing agency which, as previously noted, would put idle funds to work, rehabilitate the railroads without large capital outlay, supply substantial orders to the iron and steel and equipment industries, and restore the lagging car and locomotive-building industries.

Equipment

Chicago — Machinery and equipment sales are in fairly steady volume, but generally are confined to small individual purchases. Machine tool inquiries appear relatively more active than actual sales, though a moderately large volume of business is pending and action is expected to be taken on a large portion of this by early next year. Only a few large lists are included. Chicago sanitary district has ordered equipment for the new Stickney plant.

Boston — Demand for machinery holds well, both inquiry and buying, a substantial volume being figured. A large part of the equipment being purchased is for replacement, some placing orders for the first time since 1929. Shops in this district are generally operating at or near capacity to meet delivery demands. There is also an improved demand for heavier electrical equipment and power house units, boilers, pumps and transformers. A large volume of machinery and equipment, including the heavier types, at the Framingham, Mass., plant of National Radiator Corp. is to be sold at auction Nov. 22.

New York—Machine tool inquiry is active, although there has been a decline in new orders. A heavy volume is still being figured, however, with indications this month will compare favorably with last in the aggregate volume of business placed. Some builders are unable to promise delivery until after the first of the year. Equipment buying in general covers a wide range.

Seattle — Turnover of logging machinery and equipment continues active in this area but mining has developed seasonal slackness. Bureau of reclamation will open bids at Denver Nov. 12 for 24-inch drill, lathe, floor crane, chain block, power hammer and other machinery.

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SPECIAL SHAPES
SAVE MACHINING...METAL...MONEY

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MONACA, PA.

Construction and Enterprise

Michigan

DETROIT—Protex Corp., Curtis building, has been organized with $10,000 capital to manufacture machines, containers and boxes, by Howard S. Gies.

DETROIT—United Platers Inc., 994 Madison avenue, has been incorporated to do general polishing, plating, rust-proofing, burnishing, etc., by Glenn H. Friedt, Grosse Pointe Park, Mich.

DETROIT — National Dispensing Corp., 6868 West Grand boulevard, has been incorporated with $200,000 capital to manufacture and assemble vending machines, dispensers and accessories, by Russell E. Anger, 1029 Ferdinand avenue, Detroit.

GRAND HAVEN, MICH. — City manager will receive bids Nov. 21 for construction of a sewage disposal plant and sewers at an estimated cost of $235,000.

JACKSON, MICH.—Walker Mfg. Co., Racine, Wis., maker of automobile jacks and accessories, has acquired property for establishment of a plant here.

KALAMAZOO, Mich. — Stewart-Kingscott Co., architect, has completed plans for construction of a storage building and factory addition in Kalamazoo for the Allen Electric Co.

MONROE, MICH.—City clerk is taking figures on a sewage disposal plant and pumping station, estimated to cost $650,000, to be erected for city of Monroe. Hoad, Decker, Shoecraft & Drury, Ann Arbor, Mich., engineers.

MUSKEGON, MICH.—Nu-Way Service Stations Inc., care of Naph-Sol Refining Co., F. H. Emig president, Muskegon, operating gasoline service stations at various points in western Michigan, is installing 500 and 1000-gallon steel tanks, electric pumps, etc., at each unit, at a cost of approximately $50,0000.

SAGINAW, MICH.—Hargett-Butts Corp., 814 North Seventh street, has been incorporated with $50,000 capital to do a general foundry and machine shop business, by Richard Raymond Butts, Saginaw.

Ohio

BARBERTON, O.—Pittsburgh Plate Glass Co., Grant building, Pittsburgh, has appropriated $1,250,000 for construction of an addition to the plant of the Columbia Chemical Co. here, for the manufacture of chlorine. The Columbia company is a division of the Pittsburgh Plate Glass Co.

GENEVA, O.—Village is making plans for sewage treatment plant, costing about $80,000. PWA funds have been allotted. R. N. Case, Town hall, city engineer.

HAMILTON, O.—Beckett Paper Co. is preparing plans for constructing and equipping a 400-pound pressure boiler and generating plant, estimated to cost $250,000. Fosdick & Hilmer, Union Trust building, Cincinnati, engineer.

NORWALK, O.—Dombart Tool & Forge Co. has been incorporated with $10,000 capital, by J. A. Dombart, R. H. Dombart and K. E. Dombart. Correspondent: G. W. Martin, Huron County bank building.

SANDUSKY, O.—Three city commissioners elected Nov. 5 are pledged to the immediate construction of a municipal electric light plant.

ST. CLAIRSVILLE, O. — Arteraft Metal Co., B. C. Zuhar manager, Martins Ferry, O., plans construction of a stove manufacturing plant here. Value of machinery to be installed is estimated at $300,000.

Illinois

CHICAGO—Fabart Instrument Co., 4740 North Clark street, is building a 2-story brick warehouse addition to its plant.

CHICAGO—Patten Tractor & Equipment Co. has leased a plant at 1056 North Kilmar avenue, containing an area of 20,000 square feet. Extensive alterations and remodeling will be started immediately.

CHICAGO—Soya products division of Glidden Co., Berea road and Madison avenue, Cleveland, will replace plant at 1845 North Laramie avenue, recently damaged by explosion. N. Ronneberg Inc., 10 South LaSalle street, is architect and engineer.

DUQUOIN, ILL.—City will soon take bids for constructing waterworks improvements, including steel tank on tower, filtration plant, etc. Approximate cost $265,000. PWA project.

MONTGOMERY, ILL.—Aurora sanitary district is preparing plans for constructing an addition and making altera-

ANALYSIS

Cr.—18%
Ni.—8%
C.—.07%

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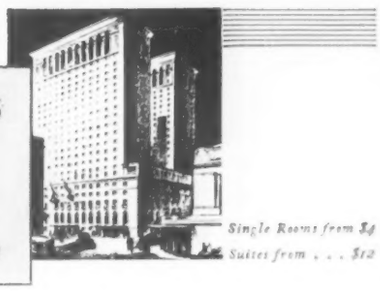

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David B. Mulligan, *President*

tions to present disposal plant, including a 1-story building, installing secondary settling tanks and gas engine. Total cost $58,000. PWA funds have been granted.

OKAWVILLE, ILL.—City will soon take bids for waterworks system, including pumping unit, steel tank on tower. PWA project. Russell & Axon, 4903 Delmar boulevard, St. Louis, engineer.

New York

ARCADE, N. Y.—Board of village trustees has approved appropriation of $80,000 for purchasing and installing diesel engines to replace steam equipment at municipal light and power plant.

BROOKLYN, N. Y.—Department of purchases, Municipal building, New York, has plans by F. L. Belknap, 539 East Eighty-eighth street, for constructing a boiler room and heating plant for warehouse and service building. Approximate cost $30,000.

NEW YORK—Bell Scrap Iron & Metal Corp. has been incorporated to deal in metals, junk and scrap iron. Papers were filed by Manuel H. Cohen, 11 West Forty-second street, New York.

ONEIDA, N. Y.—City is preparing plans for constructing filtration plant, costing $80,000. PWA funds have been allotted. Barker & Wheeler, 36 State street, Albany, N. Y., engineer

Pennsylvania

LANSDALE, PA.—Lansdale Structural Steel & Machine Co., Norman P. Farrar, vice president and sales manager, will be in the market soon for the following equipment: Machine for bending steel I beams, high-speed power hack saw to take 24-inch blade, and high-speed drill press, minimum gap 16 inches. Used machines will be considered.

McKEES ROCKS, PA.—Enterprise Can Co. has completed plans for construction of an addition to its factory on Chambers street. Will soon award contracts.

PITTSBURGH — Atlas Equipment Corp. has filed articles of incorporation with the department of state, Harrisburg, Pa., through C. H. Bonner, attorney, 1712 Farmers Bank building, Pittsburgh, for the purpose of manufacturing, buying, selling, repairing and otherwise dealing in machinery, equipment, appliances, materials and supplies of every kind.

ROYERSFORD, PA.—Diamond Glass Co. has begun work on construction of a new glass furnace building, 60 x 80 feet, together with warehouse for storage purposes, 120 x 120 feet. New equipment and machinery will be installed.

District of Columbia

WASHINGTON—Bureau of supplies and accounts, navy department, will open bids Nov. 19, schedule 6401, portable electric drills and grinders; schedule 6418, one motor-driven medium heavy duty engine lathe; schedule 6433, one motor-driven centrifugal pump, and schedule 6438, one motor-driven heavy duty engine lathe, both delivered Charleston, S. C.; schedule 6434, motor-driven tool and cutter universal grinder and equipment, delivered Washington; Nov. 22, schedule 6422, motor-geared pneumatic hoists; schedule 6423, motor-driven woodworking lathes, delivered Mare Island, Calif.; schedule 6424, one motor-driven buffer and polishing machine, delivered Keyport, Wash.; schedule 6430, one motor-driven surface grinding machine, delivered Mare Island, Calif.

Kentucky

COVINGTON, KY.—Bavarian Brewery Co. plans improvements and extensions to its 4-story brewery, and will install mechanical bottling equipment and other facilities. Estimated cost $75,000. Leslie S. Deglow, architect, 528 West Twelfth street.

NEWPORT, KY.—Andrews Steel Co. is reported having under way building and improvement work, including the installation of new equipment.

Georgia

SAVANNAH, GA.—City, Thomas Gamble mayor, receives bids Nov. 21 for construction of well, pumping machinery, pump house and pipe line. L. A. East, superintendent waterworks.

SAVANNAH, GA.—Savannah Electric & Power Co. will expend $350,000 for improving its Riverside power plant, installing a 7500-kilowatt turbine unit and auxiliaries. Stone & Webster Engineering Corp., 49 Federal street, Boston, is in charge of work.

SYLVANIA, GA.—Screven Oil Mill, W. E. Hudmon president, wants prices and data on one 150-horsepower and one 80-horsepower belt drive diesel oil engine.

Louisiana

NEW ORLEANS—City has approval by PWA for $1,800,000 federal funds for sewer construction.

Mississippi

CRANDALL, MISS.—Long-Bell Sales Corp. is planning to resume active milling operations here, and will install modern saw mills, dry kilns, planers, etc.

North Carolina

CHARLOTTE, N. C.—Old Dominion Box Co., Lynchburg, Va., has acquired the building formerly occupied by the Savona Mill Co. here. Extensive alterations and remodeling will be undertaken and the new plant will be equipped with machinery and other facilities for the manufacture of all classes, types and sizes of containers. D. H. Dillard is president.

Tennessee

BELL BUCKLE, TENN.—City plans $61,000 waterworks system. PWA application has been approved. C. N. Harrub Engineering Co., engineer, American National Bank building, Nashville, Tenn.

CHATTANOOGA, TENN. — United States Pipe & Foundry Co., J. T. Giles manager, is razing the old buildings on the site it has acquired for the construction of a new plant on Twenty-seventh street. Work will get under way soon. Upon completion of the new plant, operations will be discontinued at the South Broad street plant. Estimated expenditure $250,000.

DANDRIDGE, TENN.—City has PWA application of $34,000 approved for waterworks. U. Snodderly engineer, Knoxville, Tenn.

DECHERD, TENN.—City will soon call for bids for $115,000 waterworks system. Freeland Roberts, engineer, Independent building, Nashville, Tenn.

LEWISBURG, TENN.—City voted $55,000 bonds for power distribution plant. PWA project. Total cost estimated at $100,000.

Virginia

HOPEWELL, VA.—Allied Chemical & Dye Corp., 61 Broadway, New York, is erecting a $1,000,000 plant adjoining its synthetic sodium nitrate plant here for the production of chlorine.

MARTINSVILLE, VA.—Fibre Board Container Co., Richmond, Va., has

(*Please turn to Page* 108)

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Ferro Manganese	Low Phos	Low Phos and Special
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HEVI DUTY ELECTRIC CO.
MILWAUKEE WISCONSIN

(*Concluded from Page* 106)

started work on a new plant here, estimated to involve an investment of $100,000. The new building, 80 x 250 feet, will house the latest type of corrugating machinery. David J. Donati Jr. is president.

RICHMOND, VA.—Viscose Corp. will spend approximately $100,000 for construction of a caustic soda reclaiming plant, and for enlargement of the company's processing department at Roanoke, Va.

WAYNESBORO, VA.—DuPont Rayon Co. is considering expending $500,000 for improvements and additions to its local plant during the next eight months.

Missouri

KANSAS CITY, MO.—Thompson Hayward Chemical Co., 2915 Southwestern boulevard, has plans by R. N. Wakefield, 1012 Baltimore street, for erection of a plant addition, costing $50,000.

KIRKSVILLE, MO.—City, A. L. Bartlett mayor, plans municipal light and power plant system, costing approximately $640,000. PWA funds have been allotted. Black & Veatch, 4706 Broad street, Kansas City, Mo., engineer. (Noted Sept. 30).

MACON, MO.—City receives bids Nov. 18 for electric generating equipment, costing approximately $80,000. Baumes & McDavitt, engineers, 1871 Railway Exchange building, St. Louis.

ST. LOUIS—Mississippi Valley Equipment Co., 511 Locust street, wants prices and data on 180 to 360-horsepower diesel engine generator sets, for export.

ST. LOUIS—Laclede Power & Light Co., E. P. Gosling president, will expend approximately $3,500,000 in improvements and extensions, in addition to the $900,000 boiler plant now under construction.

Arkansas

DE VALLS BLUFF, ARK.—Town, John S. Whitcomb mayor, Hugh R. Carter, engineer, 607 National Standard building, Little Rock, Ark., will take bids at Little Rock, Ark., Nov. 14 for furnishing tools, equipment and materials for constructing complete waterworks plant, including drilling well and constructing elevated tank and pump house.

Texas

BIG WELLS, TEX.—City, F. V. Standifer mayor, receives bids Nov. 22 for construction of deep well, elevated tank and tower, pump house, pumping equipment, water meters, etc. Fred E. Hess, consulting engineer, 507 First avenue, Dallas, Tex.

BRYSON, TEX.—City is having plans prepared for a $30,000 waterworks and sewer system, including storage tank and tower, pump house and pump equipment. Hawley, Freese & Nichols, consulting engineers, Capps building, Fort Worth, Tex.

HOUSTON, TEX.—Sphinx Oil & Refining Co., recently incorporated by George Arnold Jr., 1245 West Pierce street, and L. M. Roach, has acquired the Phoenix Refining Co., 7400 Manchester street, which it will remodel and install additional machinery.

KINGSVILLE, TEX.—City, R. L. Peurifoy engineer, 729 West Lee street, will purchase a 25-horsepower gasoline engine to be installed in pump house, and two 20-horsepower emergency sewage pumps; two 500-gallon sewage pumps with electric motors, and a 400 gallon-per-minute, portable sump pump.

Wisconsin

BELOIT, WIS.—Electrical Equipment Mfg. Co., W. R. Cones, principal owner, will build a new plant, 150 x 200 feet, to greatly enlarge its capacity for manufacturing welding units, light plants, storage batteries and battery chargers.

MILWAUKEE—John W. Sanders, who purchased a controlling interest in the defunct Great Lakes Malleable Co., is reopening the plant at 1831 South First street, idle for three years. It is now being reconditioned. The shop is equipped with a 30-ton furnace.

MILWAUKEE — Globe-Union Mfg. Co., manufacturer of storage batteries, roller skates, radio parts, etc., with main works here, is planning establishment of two new branch factories, one in Texas and another in an undisclosed locality. Chester O. Wanvig is president.

MILWAUKEE—Simplex Brass & Aluminum Co. has been organized by three former employes of the Sea-Thor Brass Foundry Co., Milwaukee, to continue operation of the shop. The plant is located at 1825 South Kinnickinnic avenue. Members of the new firm are H. F. Oertsch, William Sliga and Paul Tietsche.

SHEBOYGAN FALLS, WIS.—Kinite Corp., Philip H. Dorr president, Milwauke has closed its die steel foundry at Fairmount, W. Va., and is transferring the plant here.

Minnesota

JANESVILLE, MINN.—Village, G. Schmidt clerk, has plans for constructing complete electric light and power system, including power house, generator equipment, etc. PWA fund of $105,455 has been allotted.

RED WING, MINN.—Chamber of commerce is negotiating with the J. W. Hubbard Co., for the establishment of a packing plant machinery manufacturing industry in Red Wing. An option has already been taken on the Betcher building here.

Iowa

DES MOINES, IOWA—B & L Motor Sales, East Third and Walnut street, will erect a 2-story addition, costing approximately $15,000. Machinery and equipment will cost $5000.

Pacific Coast

LOS ANGELES—Work has been started on a $200,000 lubricants compounding and storage plant on Twenty-sixth street between Soto street and Downey road in Vernon, Calif., for the Pennzoil Co. The new plant will comprise a main warehouse, grease plant, power plant, compounding rooms and cooper shop, garage and storage unit.

WHITTIER, CALIF. — City plans special election Nov. 26 to vote $370,000 bonds to assist in financing construction of municipal light plant, estimated to cost $662,000. PWA has approved fund of $292,000. D. E. Allen is clerk.

BREMERTON, WASH.—Kerr Motor Co. is asking bids for construction of a building to house offices, warehouse and repair shop, and will install all necessary equipment.

SEATTLE—Panama Machinery & Equipment Co. has leased a 2-story plant building at 2217 First avenue, South.

MOUNT VERNON, WASH.—Everett Hall will begin construction at once of a $15,000 cold storage plant, 49 x 100 feet, the first of several units. Machinery and equipment will be installed.

Dominion of Canada

HAMILTON, ONT.—Stanley Works of Canada has awarded contract for erection of large addition to its factory.

TORONTO, ONT.—National Cash Register Co. of Canada Ltd. will begin at once the construction of a large new plant here.

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